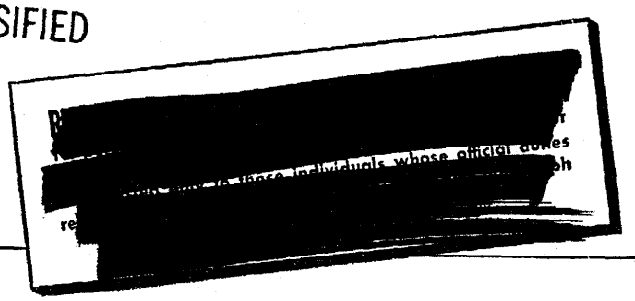
WAR DEPARTMENT PAMPHLET NO. 20-17

LESSONS LEARNED

and

EXPEDIENTS USED IN COMBAT

WAR DEPARTMENT • JULY 1945



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BY ORDER OF THE SECRETARY OF WAR:

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FOREWORD

"FOOLS SAY THEY LEARN BY EXPERIENCE. I PREFER TO LEARN BY OTHER PEOPLE'S EXPERIENCE."—*BISMARCK.*

The purpose of this pamphlet is to make available to military personnel a cataloged reference to some pertinent observations from theaters of operations.

In general, the experiences of combat commanders may be summed up in the words of one commander who said, ". . . it appeared significant that when principles taught in Field Manuals were followed, good results were achieved, and deviations brought trouble." Commanders in all theaters stress the following points:

THOROUGH AND COMPLETE BASIC TRAINING FOR THE INDIVIDUAL AND FOR SMALL UNITS.

DEVELOPMENT OF THE OFFENSIVE SPIRIT AND EAGERNESS TO CLOSE WITH AND DESTROY THE ENEMY.

VIGOROUS AND UNDERSTANDING LEADERSHIP.

DEVELOPMENT OF TEAMWORK IN THE EMPLOYMENT OF THE COMBINED ARMS.

PHYSICAL FITNESS.

The old saying "live and learn" must be reversed in war, for there we "learn and live"; otherwise, we die. It is with this learning, in order to live, that the Army is so vitally concerned. Months of training are spent in the endeavor to convert a civilian into an efficient soldier. In this training the Army encourages soldiers to profit from the battle experiences of others. With few exceptions, the lessons cited here are already covered or implied in War Department training literature. Additions or changes to War Department manuals which may be necessary will be published by the War Department.

CONTENTS

Note. Where applicable, Chapters 2 to 8 inclusive are subdivided into the following sections:

Scouting and Patrolling
Attack
Defense
River Crossing
Amphibious Operations
Combat in Towns
Attack of Fortified Positions
Miscellaneous

To assist the reader to find a particular lesson, subjects are listed alphabetically within each section.

Chapter 1

BASIC

Section I. LEADERSHIP

1. Battlefield Inertia. The effect on most men of the impact of battle is to cause them to want to do nothing. Driving leadership must be exerted to accomplish simple tasks, for men are likely to neglect duties which they know must be performed. The leader must check at all times to insure the posting of sentries, dispatching of patrols, seeking of fields of fire, and to be sure that the men retain their equipment in working order. (ETO–SWPA)

Figure 1. Battlefield inertia.

2. Discipline. Commanders and staffs must take care that the orders they issue are consistent, correct, and can be carried out. Officers should give orders which are justifiable and explainable, but they must not explain or justify them. To do so wastes time and creates doubt. Discipline in combat depends largely upon the men's knowledge that the officer leading them knows his business.

Officers and NCO's must become sufficiently hardboiled to exact from their subordinates meticulous obedience to every order. All men must be ingrained with the realization that orders are not to be treated as suggestions but as commands calling for the utmost effort until they have been carried out. Many feel that orders which are inconvenient or unpopular are to be disregarded. This state of mind is a disease and must be eliminated. (ALL THEATERS)

3. Casualties. "One of the worst things an officer encounters early in combat is the feeling of direct personal responsibility for each casualty. He must steel himself and realize that casualties are an expected product of war and must be accepted as such. The 'sweating out' of each patrol, each attack, is costly in energy, and must be replaced by mental activity before the order is issued—not after." (MTO)

4. Personal Example. We overemphasize personal example leadership in our training to such an extent that we are losing many valuable leaders, from generals to corporals. Experienced leaders are difficult to replace, and the loss is seriously affecting the efficiency of some of our units.

Emergencies sometimes arise which require leaders to expose themselves and, by personal example, get an attack moving or calm down men who are about to break. A report from the ETO states, "The forward movement had bogged down. The company commander walked forward to the front line and calmly began calling individuals by name and directing them to do certain things. They obeyed. In a short time control had been regained and the base of fire established. The unit then went forward under fire to capture its objective."

High ranking officers—battalion, regiment, and division commanders —well forward give men confidence. Some leaders, however, carry it to the point where their presence is almost SOP and their junior officers do not move unless they are there. A regimental or battalion commander with a front-line platoon can affect only a small part of his front; in the meantime he is out of contact with his other units, which are losing the benefit of his training and experience. More emphasis should be given to training each man to do his job, then giving him the chance and requiring him to do it.

Although an officer must direct from a position somewhat safer than

the lead-off spot, he must take a sufficient number of calculated risks so that the men will know that his personal safety is not a paramount consideration. He must, on the other hand, always dig in, always take cover; his men must know that when he ducks they must duck; they must not think that when he ducks, they must run away. Leaders must not use signals which can be observed by an alert enemy, and they must not carry openly equipment which is indicative of their positions as leaders. Too much bravado by leaders with a view to heartening their troops soon becomes ineffective. (ALL THEATERS)

5. Training. Commanders must study subordinates carefully and avoid "pushing" those who do not need it. Such pressure from above not only causes considerable irritation, but also results in unnecessary casualties and often, premature commitment of reserves.

The American officer is a good leader in battle, not afraid to be out front with his men. Balanced against this, and preventing him from becoming a superior leader is his reluctance to accept responsibility commensurate with his rank and his lack of those qualities of leadership concerned with the care of his men.

During training, too much of the instruction may be given by officers with consequent neglect of the development of noncommissioned officers. They must be given more training in the acceptance of responsibility; too often they look to the officers for direction when they should use their own initiative and act. One source of this weakness is the old garrison habit of having an officer supervise everything, down to the last little routine detail. A commander in the Mediterranean theater recommends, "Build NCO's by giving them added responsibility. Here extremely important missions are given to NCO's as a matter of routine —matters that involve life and death. Give them more specific responsibilities during training periods; take some of the responsibilities from junior officers and give them to NCO's as training." (ALL THEATERS)

6. Leadership. "Leadership is based on knowledge. First, every officer and enlisted man must know his job; this yields faith in each other. Second, every man must realize that his officers and NCO's know their jobs; this gives confidence in command. Third, each man must know his mission and the mission of the unit; this gives continuity of effort regardless of losses. The first is obtained in training; the second, in maneuvers and combat; and the third, by careful briefing and orientation on the ground." (ETO)

Section II. MORALE

7. Like Leadership, Morale Is Based on Knowledge. Morale is high when the soldier is fully occupied in offensive action having a readily comprehensible value toward the accomplishment of an objective. The American soldier is not sufficiently military to maintain morale and maximum effort in simple blind obedience to orders, but will exert amazing effort at anything he understands. Every man should be completely familiar with his unit's mission and what is expected of him. If he is given this information and is made to understand that his individual success or failure may affect the accomplishment of the mission, he may be relied upon to carry on and do his job despite unforeseen confusion. All men should be given the big picture as well as the little one.

Rumors spread like wildfire. The best way to prevent them or spike them is to take the men into full confidence and tell them all that security will allow. Make them understand that there are some things that can't be told them, and why.

New men should be thoroughly oriented and put at ease as soon as they join an outfit. They must be made to feel that they are an important part of the crew. (ALL THEATERS)

8. "Close Order Drill and full field inspection one day after coming off the front lines snapped one of our battalions back into shape quickly. They had lost NCO's and officers, and had been fighting steadily for two weeks. Their discipline and morale were low; they were tired and very sluggish. They were mainly veterans of Guadalcanal and New Guinea and considered themselves above such things as close order drill. Although they objected strenuously, they did it with snap, and the outfit benefited greatly. It gave the new platoon leaders, platoon sergeants, and squad leaders a chance to see what their men looked like and to give them a few commands. I believe practically everyone recognized the excellent results obtained." (CBI)

9. "Confidence is the biggest asset a man in combat can have. It is always comforting to remember that the enemy is as much, or more, afraid than you are." (ETO)

10. Discipline includes water discipline, malaria discipline, personal appearance, military courtesy, wearing of the uniform, personal and collective sanitation, carrying out of orders in general, and assumption and proper discharge of responsibility throughout the chain of command. A well-disciplined outfit goes farther with fewer losses. Even at the front it is marked by its morale, pride of unit, saluting, and appearance. It is not necessary to eat out of tomato cans, wear muddy clothes, and fail

to shave or salute to be a good fighter. There is an inclination for some men to "go native" in the Orient—to let down mentally on material and spiritual values—so discipline is especially needed there. (ALL THEATERS)

11. "Discipline makes the difference between winning and losing. I have had a few eight-balls who fought like hell, but I had a lot more men who never caused me any trouble, and who were quiet, confident, and disciplined; those men fought a lot better." (MTO)

12. Evacuation. "One of the reasons a soldier dislikes making a night attack is that he fears being wounded and overlooked in the darkness. Attaching luminous tape or markers to the men would help overcome this feeling." (ETO)

13. Gas Masks. "We eliminated gas masks from the burden of the individual soldier, but at the same time kept them readily available, by carrying them in a low box built on top of the kitchen truck cab. One such box, no higher than the bows of the truck, will carry the gas masks of a company." (ETO)

14. Rest. "Battalion commanders should be given a period of rest after 60 days of continuous contact. The regimental commander also deserves consideration but the battalion commander fights his battalion all day and then spends the greater part of the night receiving or getting out orders. The human body cannot go on under such conditions and the officer casualty rate will be high." (ETO)

15. Shellreps. "During heavy shelling from enemy batteries, the FO can give the men a boost if he can tell them the type of shells the enemy is using and where they are coming from. It helps to know that he is there sending in the shell reports and preparing to return that fire many times over." (ETO)

16. Showers and Laundries. "Combination shower and laundry units should be available to front-line troops. Improvise portable units from captured enemy equipment and vehicles." (ETO)

17. Wounded. "Wounded men returned to duty should be sent directly to their original units instead of through the replacement channels. Give us back our old men and debit our replacement requisitions. These old men want to come back and we certainly need them, if for no other reason than the morale factor." (ETO)

Section III. TRAINING

18. Air Targets. "All officers as far down as battalions should be well trained to distinguish good air targets and to request air action against them." (ETO)

19. Ambush. "Learn ambush tactics. Teach the men to get in the rear of any enemy group, capture it quickly, and set an ambush for the next group, which will always come to see what happened." (ETO-SWPA)

20. Ammunition. "Commanders have difficulty getting new men to understand that they must take all the ammunition they need from the bodies of the dead, and from casualties that are to be evacuated. This is important enough to merit its being taught in basic and unit training. Supplies must not be allowed to go to the rear, even as far as the battalion aid station." (ETO)

21. "Amphibious practice driving should include training in driving in reverse up a steep ramp, the foot of which is in sand and water, to simulate embarkation in LST's and LSM's. Drivers should also be instructed in debarkation procedure." (SWPA)

22. Antitank. "Every soldier should be given a ride in a buttoned-up tank to show him the limited vision and field of fire, and the closed-off feeling of the tankers. It will do much to counteract the dread of a tank attack, and will increase faith in his own ability to resist one." (ETO)

23. Area Firing. "In actual combat, the occasion is rare when a rifleman actually sees an individual enemy. The tendency of the rifleman has been to withhold his fire until he sees a 'target,' thus delaying the building up of the desired volume of fire. In training, more emphasis must be placed on area fire, as distinguished from point target firing." (MTO)

24. "Artillery Preparation Fires, expensive in ammunition, have been wasted because they were not closely followed up by the attacking forces. Supporting fires do not destroy the enemy but merely force him underground for a brief period. The attackers must be on top of the enemy when he 'pops up' again." (ETO)

25. Basic Training. "We wish we had spent more time on many things learned in the States. * * * * * * * * I can tell you this: stress field firing at unknown ranges. Stress mine training, tank-infantry teamwork, and reconnaissance by fire." (ETO)

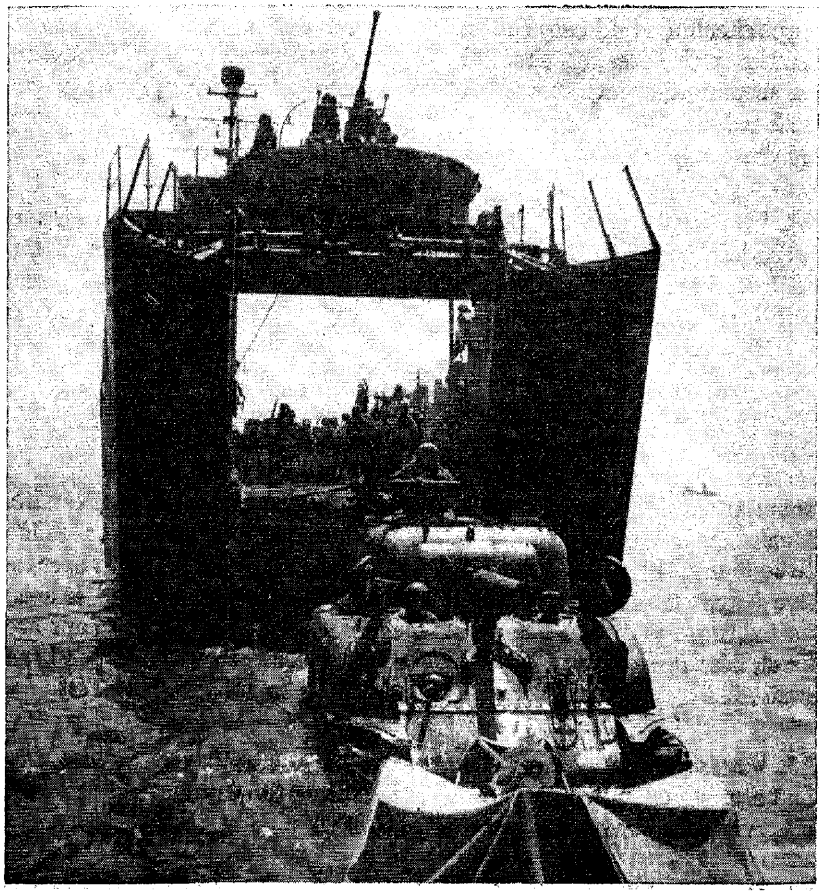

Figure 2. Amphibious practice driving.

26. "Booby Trap Flares may be improvised by taping a half-pound block of TNT, with a firing device inserted, to the nose of a 60-mm mortar illumination shell, after removing the safety wire from the nose of the shell. The device should be fastened firmly to some object, with trip wire extended in several directions. Pressure on the wire detonates the TNT, which fires the shell. Care must be taken to place the flares at least 50 yards from and higher than friendly gun positions, or the gunners will be blinded by the glare." (ETO)

27. Booby Traps. "In areas where foliage grows rapidly, booby traps of the trip-wire type are considered undesirable. Foliage which has grown up around such an installation creates a hazard to our troops when they have to clear the area. It is felt that mine fields and booby

traps should be laid only in isolated cases and that, if our troops are to remain in the area, all should be electrically controlled. In any event, an accurate diagram showing the location of each booby trap or mine, with reference to easily identified terrain features, must be maintained by the company, battalion, or regiment." (SWPA)

28. "Booby Traps can be made with WP or fragmentation hand grenades by removing the safety pin, placing the grenade in the container (minus the cover) which is anchored to the ground, and attaching a trip wire to the grenade. When the wire is hit, the grenade is pulled from the container and activated." (ETO)

29. Booby Traps. "We avoid casualties while installing booby traps by using an improvised firing device consisting of two metal contacts installed at any point between the power unit and the blasting cap. The contacts are held apart by a wooden wedge connected to a trip wire. During installation, the battery is not connected. This makes it possible to test the trip wire. A used BA–70 supplies sufficient current to operate five traps wired in series. W–130 is used as a conductor and is connected to poles plus B 1 and plus B 2. No. 6 electric blasting caps are used. Neutralization of TNT blocks by exposure to weather has been prevented by encasing the half-pound blocks in rubbers." (ETO)

30. "Camouflage training should start with recruits on the first day and should never stop. Men should be trained to stay motionless under observation, either ground or air." (NATO)

31. Command Posts. "In forward areas, the use of CP signs and CP guides should be strictly limited. All CP signs should be removed during hours of darkness, and their use during daylight hours should be governed by enemy observation. Guides should not stand boldly on guard at the entrances to CP's, but should be in a foxhole at a distance, where they can accomplish their mission without coming under enemy observation and without giving away the location of the CP. Under no circumstances should traffic be allowed to flow in and out of CP's. Despite all these limitations, special pains should be taken to insure that key command personnel are able to locate the CP with the least delay." (NATO)

32. Conservation of Equipment. "Men must be impressed with the necessity of conserving unit and individual equipment. Most soldiers have the idea that since the accountability for property ceases upon entering the battle area, such equipment will be available when the

immediate need arises. Consequently, they are careless in handling and maintaining property." (ETO)

33 Discipline. "Probably because of our way of life, there is, in the soldier, an innate dislike for discipline. This results in sloppy saluting, carelessness in personal appearance and uniform, and disregard for authority. Officers fail to require a high standard of military courtesy and discipline. Properly trained, the American soldier is capable of assimilating discipline to a high degree." (ETO–SWPA)

34. "Drivers cannot be overtrained. Driving in mud, blackout driving, concealment of vehicles, dispersion, destruction of vehicle in case of abandonment, and the use of winch and blocks should not be neglected. Since drivers suffer great physical strain, constant rotation of driver and assistant is necessary. Assistant drivers must be as well trained as regular drivers; select competent men for these jobs. Trains are seldom used in combat; teach drivers to operate as individuals. Knowledge of map reading by drivers cannot be overemphasized. The driver must know his vehicle, not just by unit assembly but cog, gear, and nut; unit assemblies are not always available, and a part here and there may do the trick." (ETO)

35. Dugouts. "When building dugouts, use ammunition cartons for ventilators. The interior will then remain dry and will not mold." (SWPA)

36. Endurance. "In offensive action, when movement is necessary, physical endurance increases. It is during periods of defensive warfare, when men are forced to remain in fox holes, that physical condition suffers." (ETO–SWPA)

37. Engineers. "Teach the engineer replacement that he must be prepared to fight. Most engineers are indoctrinated with the fact that engineer troops are seldom, if ever, employed as infantry." (ETO)

38. Explosives. "During basic training, all men should receive some instruction in use of explosives. Demolition men or engineers are not always available during combat." (ETO)

39. Field Fortifications. "In the attack, do not dig in at every stop. In defense, dig in. Keep men attack-minded; it is too easy to grow defense-minded." (ETO)

40. Field Glasses. "Wear field glasses, without the case, inside the shirt or jacket. This holds them steady and prevents identification of leaders by the enemy." (SWPA)

41. First Aid. Additional training is needed to get wounded men to give themselves proper first aid promptly and to move to the rear under their own power when they can. Some men, by waiting and calling for aid men and litter bearers, not only increase the ill effects of their own wounds, but also occupy the attention of medical personnel needed to aid more seriously wounded. The individual line soldier's responsibility for first aid must be indoctrinated continually. (ETO)

42. Forward Observers. "Training of officers and NCO's as artillery forward observers should be stressed as much as possible. Use of infantrymen as FO's has proved invaluable." (MTO)

43. Fox Holes. "In rocky terrain where digging is impossible, place rocks around the body and lie in prone position." (MTO)

44. Grenades. "Teach the men to throw grenades from every angle. In battle they won't get the chance to take up a stance and heave them gracefully." (ETO–SWPA)

45. Hammocks. "Hammocks must not be used until the area is completely secured. A man cannot protect himself in a hammock, or anywhere above ground level, in case of attack. Men must stay below ground level even though it is raining or the enemy is not expected in the area." (SWPA)

46. Identification of Armor. "Care should be exercised to insure that TD units receive tank warnings based on facts. False alerts tend to make gun crews sceptical. Some units regard any tracked vehicle as a tank, and promptly report it as such. This destroys the efficiency of the warning systems. Front line troops should be thoroughly familiar with identification of enemy armor." (ETO)

47. Individual Training. "I wish I had had more training in taking care of myself in action. I depended too much on my corporals, sergeants, and officers to look out for me and there were a lot of times when they were not near me. When you are in action you have to depend upon yourself; you can't lean on others for support. Every man must bear his own load." (ETO)

48. Initiative. "Too many officers and men wait to be told what to do next. It is my opinion that an infantry battalion or any other combat

unit is not properly trained until every officer and man in the battalion can do his part without orders, over a considerable period of time." (MTO)

49. Inspections. "The importance of continuous checks by all commanders has been definitely shown. The lack of experienced junior officers has made it imperative that detailed inspections be made by all responsible commanders." (MTO)

50. Jeep (¼-ton truck). "The jeep is the most versatile vehicle on the battlefield." (ALL THEATERS)

51. Junior Officers. "I have no great fault to find with our training doctrines or methods. Generally, they are sound. It is in the application of them that we fail. If only we can now, even now that we are at grips with the enemy, impress upon junior officers, on whom we must depend in great measure, the deadly seriousness of the job, the absolute necessity for thoroughness in every detail, then we will begin to get results. But seemingly we have been unable to do this. We must try again, and harder." (ETO)

52. Launching 60-mm Shells. "The M7 grenade launcher can be used to launch the 60-mm mortar shell to a maximum range of 125 yards." (ETO)

53. Liaison Officers. "If you are ever made a liaison officer, learn everything there is to know about your unit. No matter how much you think you know, you'll never know enough to answer all the questions put to you by commanding officers to whom you are assigned to perform liaison work." (NATO)

54. Manuals. "Remember, the little things make or break you in battle. Don't pass over your Field Manuals and Army Regulations lightly; all the material you need in battle is included in them. It's up to you to dig it out." (MTO)

55. Marching Bazooka Fire. "We have used marching bazooka fire against enemy vehicles and in the attack against towns. We use one bazooka per squad. Actually the bazooka teams stop movement forward for an instant while the weapons are fired. This method of attack has proved very successful." (ETO)

56. Marching Bazooka Fire. "In an operation near Maiziers, France, we employed marching bazooka fire. Ordinarily this is not employed

because there are too many duds when the projectiles strike nothing harder than the ground. However, we attacked against Germans defending a strong point on a slag pile. There was one bazooka per squad firing as rapidly as facility would permit. It was very effective since the enemy was badly shaken. The reason for this was that the shells striking against the hard pieces of slag exploded and showered the Germans with slag and shell fragments." (ETO)

57. Marching Fire. "In marching fire, we use the rifle grenade instead of the bazooka. The new attachment works very well and the grenades are accurate up to 150 yards. The team used in marching fire consists of—

1 man, rifle grenadier
1 BAR team (2 men)
3 riflemen

Results obtained have been excellent." (ETO)

58. Marching Fire. "The cagey enemy may be there opposite you and if he finds that you are not using the proper fire distribution and not covering the entire target area—every bush, rock, stump, or place you think he might be—he'll pick your men off one by one until they place some fire in his direction. So remember, march and fire! Fire where you think he might be or where you'd be if you were he." (ETO)

59. Marching Fire. "Men must learn to use marching fire, and NCO's to control it. Two or three rounds of tracer per clip increases the effectiveness of marching fire, for the men fire too low when using ball ammunition alone. Put all the rifle grenadiers in the leading wave to increase the fire. Use one WP grenade to each five frag grenades. Lob bazooka rockets over the heads of the assault waves to create the impression that the artillery is still firing." (ETO)

60. Marching Fire. "In one case of an attack where marching fire was not used the attack was repulsed with heavy losses. In another attack under very similar conditions but using marching fire the attack succeeded; fifty-odd Germans were killed and over two hundred and thirty captured with the loss of one man to the attacker." (ETO)

61. Marching Fire. "We have proved marching fire to be very effective in closing with the enemy and preventing him from using his light automatic weapons. On one occasion, we actually came up to a trench in which the Germans were sitting and crying because they dared not get up to use their weapons. Our losses were negligible; if we had not

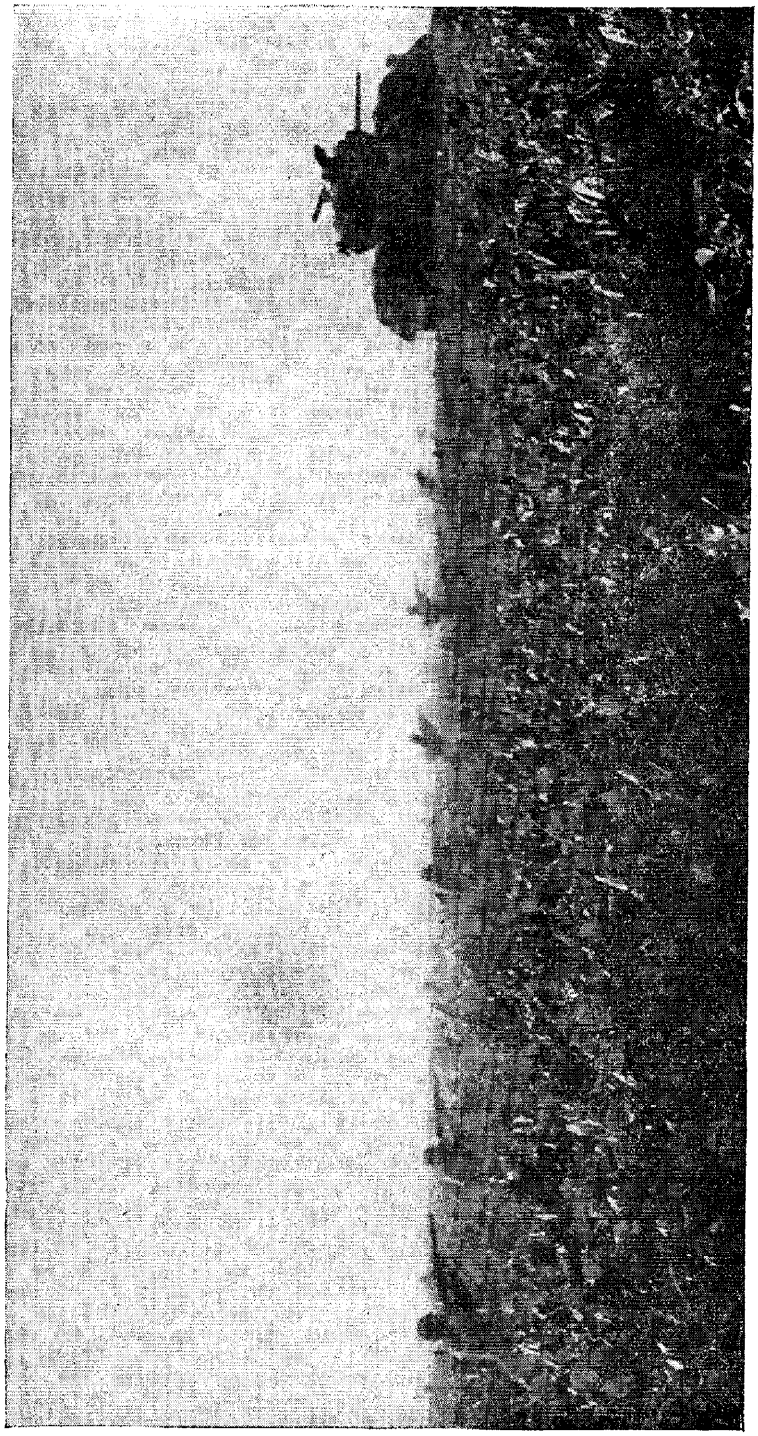

Figure 3. Marching fire.

used assault fire we would probably have received heavy fire from the trench as we closed in." (ETO)

62. Marching Fire. "When the enemy is located or suspected, this outfit opens up with all automatic weapons available and continues marching fire as we advance. PW's report that they could not do anything against us, that 50-caliber slugs were flying everywhere, ricochetting in every direction, that tree limbs came crashing down on them and the fire was just too much for them. They had never seen so much fire." (ETO)

63. Marching Fire. "In a recent attack, my platoon employed assault fire continually and in gaining fire superiority, forced the enemy to retreat constantly. The next day in counting the enemy dead, we found out how successful the assault fire had been." (ETO)

64. "Marching Fire has paid off one hundred percent in diminishing casualties, improving self-confidence of our men, and enabling us to take many difficult objectives. The men are really sold on this system of attack." (ETO)

65. Mine Fields must be marked. "We have lost men and vehicles because the following basic rules were violated: Units being relieved must furnish complete information of friendly mine fields to the relieving units. When our mine fields block a road or an area that friendly troops may use, they must be marked and guarded. When a friendly mine field is no longer needed, it must be taken up." (ETO)

66. Mines and Booby Traps. "Thorough training in mine and booby trap clearance is essential for all personnel of combat units." (MTO)

67. Motor Marches. "The following rules will save time, fuel, and trouble on motor movements:

a. When a column is held up other than for a scheduled halt, an officer should investigate. Often it is because a driver has fallen asleep or is derelict in some other way.

b. When halted, turn off the engines to save gas and oil.

c. Require drivers to observe and establish security.

d. Brief the drivers before moving out. Give them maps or road sketches and require that they be able to read them." (ETO)

68. Mountain Training. "When we were back in the States we failed to use rugged terrain as a conditioning agent. Company and platoon leaders, in preparing combat problems, spent hours reconnoitering for

the most favorable terrain, and avoided the slightest hill mass. This was a grave mistake, because now we find in combat that we have to climb mountains 2,000 to 6,000 feet high and fight when we get to the top." (MTO)

69. New Weapons. "In war it is unwise, if not dangerous, to force upon men equipment in which they have no confidence. The soldier must be convinced of the efficiency of the weapons allotted to him and he must be trained in their use. This means, not only that new weapons must be thoroughly tested and proved, but they must be given to organic units trained in their tactical and technical use." (ETO)

70. Night Operations. "It is recommended that in the training program for replacements a much larger portion of time be spent on night operations and field exercises. These men should never be permitted to become 'barracks soldiers'." (ETO)

71. Officer Specialists. "There is a tendency to make the officer a specialist while he lacks experience in the actual handling of troops in small unit problems. He is deficient in map work and in the use, mechanical functions, and capabilities of weapons, and the coordination of combined arms." (ETO–SWPA)

72. Orders. "Every man in the squad should listen to his squad leader's orders with the thought in mind that he may have to be the squad leader before the battle is over." (ETO)

73. Patrolling. "In training for patrolling, it is rarely realized that, once contact has been made, caution and concealment must be cast aside, and every man must act boldly and speedily. Noise, properly controlled, is a powerful morale weapon for the attackers." (ETO)

74. Patrols, Evacuation. "Provide patrols with an emergency plan and means for evacuation of exhausted or wounded." (MTO–SWPA)

75. Patrols. "Break large patrols into small groups separated by a few minutes. On rough trails, bunching retards the speed of a large patrol." (MTO–SWPA)

76. Perimeter Defense. "The most efficient and least costly way to kill Japs is to let them attack at night. The Banzai attack is the ultimate in efficiency. The success of a unit here is measured in terms of how many Japs it has killed, so rather than promote night attacks on our part, the best solution seems to be to get a good perimeter defense and

then let the Jap attack. It would appear that although perimeters were designed for jungles, the Jap night habits seem to make the perimeter a desirable feature of the night defense, without regard for terrain." (OKINAWA)

77. Pillboxes. "Do not let men move around close to captured pillboxes which are within enemy artillery range. The enemy will have the correct range and the first round fired will land right on the pillbox." (ETO)

78. Prisoners. "Never go forward to accept the surrender of prisoners. Stay down and make them come to you." (ETO)

79. Prisoners. "A prisoner is not a prisoner until searched for concealed weapons." (ETO–SWPA)

80. Reorganization. "The constant change and loss of personnel due to sickness, rotation, promotion, and enemy action necessitates that a unit be withdrawn from the lines periodically for reorganization and training." (ETO)

81. Replacements. "When you receive replacements they should not be sent into battle for at least three days. This time should be provided so that the men may get to know their leaders, and the leaders to know their men." (ETO)

82. Replacements. "It has been found helpful, when the situation permits, to place small numbers of officers and enlisted men from replacement battalions on detached service for periods up to one week with combat organizations. They are not permitted to take part in any major operation but are thoroughly familiarized with the organization and with the routine of living at the front. They learn many tricks of the trade in a few days. If practicable, these men when finally assigned, go to the organization with which they received their battle inoculation. Even if this is not possible, the men and the organization to which they go have both benefited." (ETO)

83. Replacements. "I have found that replacements have an erroneous idea of the situation at the front; they have heard too many wild stories from the casuals. I counteract this by using a team composed of casual officers and enlisted men to go from battalion to battalion in the depot conducting lectures and answering questions." (ETO)

84. Resourcefulness. "The most important need—and the greatest lack—in our forces is resourcefulness on the part of individuals and the

leaders of squads and platoons. They must be taught to visualize and plan several ways to handle any situation before them, and to act decisively and promptly according to whichever of these plans is found most promising. This training, and all other training of troops, must take place well in advance of combat; no further training is feasible after the situation has become tactical." (SWPA)

85. Rest Period. "When a unit is withdrawn from the line after combat, do not call it a *rest period*. Let the officers and men know that they are reconditioning for the next fight. Make provision for keeping the men busy all the time by organized training and recreation. Do not afford them time to think about their battle experiences, except in connection with training for the next engagement." (ETO)

86. Scouting and Patrolling. "Here's what I would do if I were 'S–3ing' again in the States. I would put in about ten hours a week of 'reporting information'. The men we have on outposts are good men, but when they fight off a Kraut patrol at night, they let it go at that. If they hear a noise they don't report it or try to identify it. They don't investigate the following morning to try to find tracks, probable routes of approach and withdrawal, signs of blood, etc. When artillery shells fall, they don't try to take an azimuth on the sound of the gun or to time the flight. They don't estimate the caliber of the piece or the number of rounds. When they go on patrol I have to sit and worm information out of them. Incidentally, some of our officers have asked patrols leading questions. That is obviously wrong because the men will agree that they saw anything that you suggest. We have to impress on the men the importance of every little thing they might see, regardless of how insignificant it might seem to them. I know that scouting and patrolling are always on the schedules, but they should be well-planned periods with intricate set-ups—fires recently extinguished, wires running into possible CP's, etc." (ETO)

87. Shellreps. "Units receiving shell fire must learn to report promptly, giving data as to number of rounds, caliber, time, approximate azimuth to enemy guns as indicated by shell furrows, etc. Shell fragments, especially those containing portions of rotating bands, are particularly desired. Early, complete reports will aid in bringing in quick counter-battery fire to stop the shelling." (ETO) (See TC 7, WD, 1945)

88. Smoke. "If an enemy smoke shell lands in your area, extinguish it promptly by throwing dirt upon it." (ETO)

89. Snipers. "One of the ruses adopted by the Japanese was to dig fox holes and post snipers to cover them. American troops would use these holes and snipers would successfully deliver fire on them." (SWPA)

90. Snipers. "Men should be taught to play dead when wounded by sniper fire. If they move, the sniper will usually fire again." (ETO)

91. Souvenirs. "The surest way to run into booby traps is to go souvenir hunting. Forget the souvenirs and spend the time fighting." (ETO–SWPA)

92. Staff Officers must have troop experience. "A man can't be a good staff officer unless he is capable of assuming command of an organization appropriate to his rank. Rotation between staff and command jobs must be frequent. Regimental S–3's and division S–2's and S–3's must demonstrate command capabilities or they cannot serve the troops properly." (ETO)

93. Terminology. "We must delete from our military vocabularies such loose expressions as 'leading elements'. If the leading element is a squad or a company, let's say squad or company and avoid confusion." (MTO)

94. Terrain. "The training of troops must conform to the terrain over which they will fight. Commanders should be given a free hand in planning the details of their operations so that tactics will conform to and take advantage of the terrain." (MTO)

95. Traffic Control. "Place guards on roads in front line areas to keep down traffic during the day. The vehicles of visitors draw artillery fire." (ETO)

96. Tree Bursts. "When the enemy fires tree bursts, it is better to stand against a tree on the side away from the direction of fire than to take up a prone position and expose the entire body to the effect of such fire. Tree bursts have generally the same effect as time fire." (ETO)

97. Trigger Happiness. "Occasionally at night, in the rear areas where service troops were bivouaced, firing would break out because some soldier thought he heard a Jap moving. Frequently this firing was taken up by others, with resultant casualties to our own troops. Too much stress cannot be put upon training of all troops, particularly those in the service elements, in withholding their fire in congested areas until they are positive an enemy is in front of them." (POA)

98. Weapons. "It is the consensus of opinion among battle-trained NCO's that men assigned to an infantry company must be able to use all weapons assigned to the company, since, sooner or later, they will be forced into a position in which they must use them." (MTO)

Figure 4. Souvenir hunting.

Chapter 2

ANTIAIRCRAFT ARTILLERY

ATTACK

99. Ground Support. "Air bursts by automatic weapons are highly effective in close support for infantry—particularly in wooded areas." (ETO)

100. Ground Support. "The M16 can be teamed with the 40-mm for support of infantry units. After obtaining air bursts against trees, buildings, etc., the 40-mm gun can be moved by the M16 before the enemy will have time to register with mortar or artillery fire; the move can be covered with the .50 cal. MG." (ETO)

101. Ground Support. "Overhead fire by automatic weapons necessitates careful choice of positions. The selection of elevated terrain will add a safety factor for friendly troops." (ETO)

102. Ground Support. "Precision ground firing by the M16 cannot be achieved once the barrels become hot. Advancing friendly troops must always be led by a minimum of 300 to 500 yards. To sweep the ground as close as 100 to 250 yards in front of the infantry is dangerous." (ETO)

103. Ground Support. "When there is a possibility of the tanks penetrating too deeply for the infantry to keep up, they can be protected from the rear with the .50 cal. MG mounted on the M16." (ETO)

104. Ground Support. "Tracer ground fire by AAA weapons has a definite morale-boosting effect on supported infantry troops, tending to lift them out of their fox holes. Conversely, it has a tremendous demoralizing effect on enemy troops." (ETO)

105. Time-on-Target (TOT) Fire. "Its high velocity and rapid rate of fire make the 90-mm gun effective in time-on-target fire." (ETO)

DEFENSE

106. Antitank Missions. "Antitank missions necessitate the 90-mm gun being made the center of an organized strong point and being supported by infantry and the covering fire of AT or TD guns. Failure to do this leaves the gun position open for reduction by enemy foot troops or armored cars." (ETO)

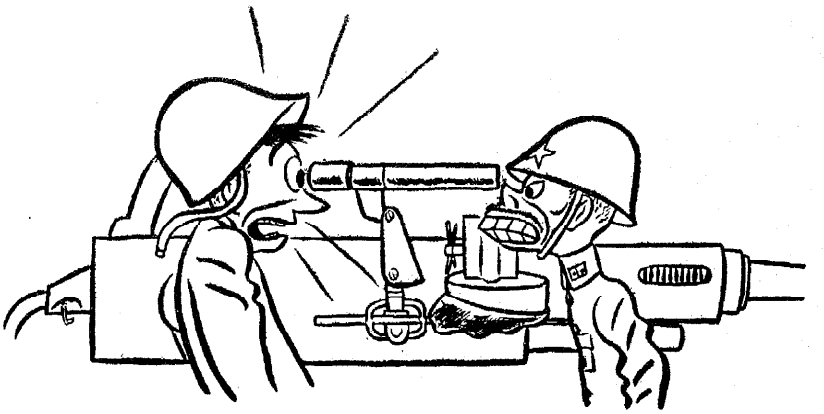

Figure 5. SURPRISED!

107. Convoys. "Convoys can be defended adequately by the use of the .50 cal. MG quadruple mount. If an air attack is severe enough to halt the convoy, the 40-mm gun can be manned and fired from the wheels in sufficient time to participate in the defense. Hooks can be constructed to lock the outriggers partially extended while traveling so that the gun can be traversed when manned." (ETO)

108. Convoy Defense. "The .50 cal. MG, quadruple mount, has proved to be the primary AAA defense weapon for all units on the march. Automatic weapons battalions, due to the effectiveness of the quadruple mount have been able to discontinue the practice of manning the 40-mm gun during a convoy movement." (ETO)

109. Digging In. "The principle of digging in equipment is one which all AAA combat units understand and practice. Some units have learned from experience that the deeper one is dug in, consistent with the field of fire to perform the assigned mission, the better protection the crew and equipment are afforded against artillery and mortar fire." (ETO)

110. Flank Protection. "Rapid advances often result in FA occupying areas where flanks have not been cleared by the infantry. On such occasions the supporting AAA automatic weapons should be located to provide flank protection in addition to the normal AAA protection." (ETO)

111. Hold Your Fire. "Low-flying aircraft can avoid light AAA fire if it opens up too soon. Surprise fire and initial effectiveness cannot be attained if fire units use sound barrages and open up beyond range." (ETO)

112. Searchlights. "Searchlights can be employed to illuminate mountainous terrain and to disclose the enemy's movements in and out of caves. Lights must be well behind the front lines as a protection from

infiltration, or, if the lights are located near the perimeter of the defense, strong security measures must be adopted." (POA)

113. SP Units. "SP units are the most effective in a fast moving situation due to their high mobility and ability to displace rapidly. Quicker AAA coverage of newly acquired road nets and availability of full fire power to protect moving convoys are additional advantages over the towed 40-mm gun." (MTO)

RIVER CROSSING

114. Bridge Construction. "Bridge construction crews should point out to the AAA any machine-gun nests and snipers that may be harassing their work. 40-mm guns can get best results against dug-in ground targets by firing HE shells and causing the supersensitive fuze to strike trees or other objects near such targets." (ETO)

115. Fire Support. "Infantry can be supported effectively with the M51. The .50 cal. MG helps to neutralize dominating ground and at the same time boosts the morale of friendly troops witnessing the fire." (ETO)

116. Support of a River Crossing with Automatic Weapons. "Necessary reconnaissance and selection of suitable positions completed, all batteries worked on gun positions during darkness. Stakes were surveyed in for each mount and for each phase so that firing could be done at night. Elevation stops were placed on mounts to prevent firing into our own positions. All positions were prepared with dug-in ammunition pits, loading pits, and connecting trenches joining these pits to each other and to the gun pit. Loading for right and left guns was done in separate pits to avoid confusion, and chests had distinctive markings so that they could be recognized in the darkness. Drills were conducted at night for practice in rapid loading of ammunition chests and service of the piece to increase proficiency in operation in the darkness. Fire was delivered before and during the actual infantry crossing and continued as a rolling barrage as the assault phase advanced on the opposite bank of the river." (ETO)

AMPHIBIOUS OPERATIONS

117. Operations. "Brigade and group headquarters should be shipped intact—not divided into an assault echelon and a follow-up echelon. In order to accomplish this, these units should be made completely mobile for waterborne invasion." (MTO)

118. Reconnaissance. "Battalion and battery commanders should precede their units ashore for reconnaissance of positions and routes thereto." (MTO)

119. Ammunition. "90-mm gun batteries should be inspected at frequent intervals to insure that basic loads consist of the fewest possible lots of ammunition. Redistribution between batteries and battalions should be effected to bring about this condition. One lot of ammunition should be completely expended before engagements are begun with another." (ETO)

120. Backsighting. "All elements of gun batteries, including the guns and the SCR–584, should be able to backsight on the director." (ETO)

121. Backsighting without Parallax. "A device to eliminate parallax while backsighting with the telescope on the SCR–584 is shown in figure 6. It consists of a disk of cardboard which has a diameter equal to that of the objective lens (1⅜-inch) and has a slit ⅛-inch wide cut accurately through the center. When the SCR–584 is being placed on the director telescope in azimuth, the disk is placed in the SCR–scope so that the slit is vertical. The observer holds his eye so that the vertical crosshair bisects the slit, thus the eye is always held at the same place during backsighting. To place the SCR–584 accurately on the director in elevation, the disk is turned 90°. The observer holds his eye in such position as to have the horizontal crosshair bisect the slit. Another suggestion is that instead of a disk to fit inside the telescope, a cup be made to fit over the outside. This cup would provide a much easier method to position the slit vertically and horizontally." (ETO)

122. Ballistic Corrections. "Units using firing tables 90AA–B–1 or 90AA–B–2 should use the additional corrections contained in TC 5, WD, 1944. The conversion of the effect of ballistic density into an

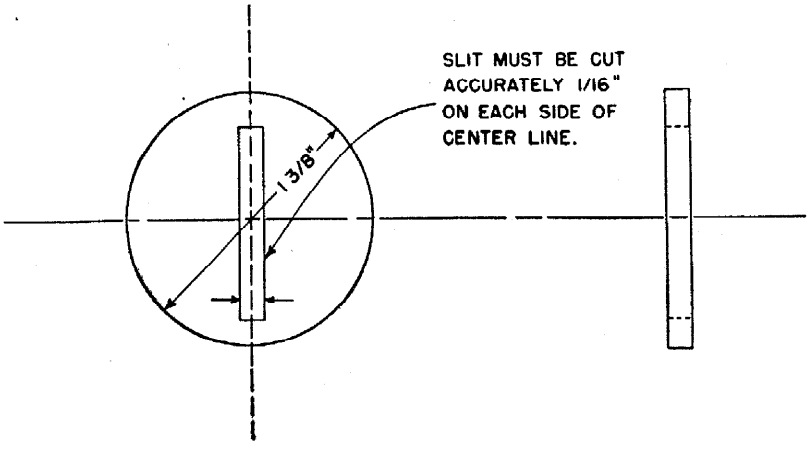

Figure 6. Eliminate parallax.

equivalent muzzle velocity effect should be discouraged. This is particularly important with VT ammunition as the conversion introduces a small error in quadrant elevation." (ETO)

123. Data Transmission Cables. "Data transmission cables should be protected by burying them in trenches. However, cable connections and junction boxes will not withstand immersion in water." (ETO)

124. Digging In. "Digging in of the SCR–584 can be expedited by bulldozers. Their use permits digging all the way in until the top of the radar van is level with the ground." (ETO)

125. Fire Discipline. "Fire discipline, particularly among AAA automatic weapons units, has presented a major problem to all AAA commanders. Rules for fire usually appear cumbersome and too complicated for the man on the gun to grasp and retain clearly in his mind at all times." (ETO)

126. Fuze Setting. "Crews of 90-mm gun batteries should be trained to set fuzes both accurately and quickly. Ammunition should be inspected to insure that fuzes will fit correctly into fuze setters." (SWPA)

127. Gun Matériel. "Many errors have been noted in leveling, orientation, synchronization, and adjustment of the remote control system. The

Figure 7. Fire or withhold fire?

following errors have been found consistently in several organizations and are items necessary for constant check:

a. Guns not carefully leveled.
b. No earth tamped under outriggers, rendering them useless.
c. Auxiliary leveling screws loose.

d. Jack clamps not locked.

e. Guns out of orientation and/or azimuth. (This was usually an error of from 3 to 8 mils. Two extreme cases of error were 123 mils in elevation and 142 mils in azimuth.)

f. Data transmission system out of synchronization. (This should be checked every few hours since selsyns tend to drift slightly.)

g. Lag meters out of mechanical zero.

h. Synchro-transformers out of adjustment. (The synchrono-transformer is similar to the selsyn in construction and tends to drift.)

i. Amplifiers unbalanced. Should be checked whenever synchronization and synchro-transformers are checked." (ETO)

128. Illumination of the Battlefield with Searchlights. "Illumination of the battlefield with searchlights offers the following advantages (see TC 28, WD, 1945):

a. Enemy installations and personnel appear on the near side of buildings, fortifications, and terrain.

b. Enemy patrol action can be seen.

c. Engineers can be assisted to dump supplies, lay and recover mine fields, and build bridges.

d. In a bridging operation, lights can be turned off during the assault and turned on after the infantry establishes the bridgehead.

e. For deception, lights can be used to draw the enemy's attention." (ETO)

129. Liaison. "Liaison must be established immediately by all echelons, with supported and adjacent arms. The AAA unit commander must acquaint supported units with the capabilities and limitations of the 90-mm gun in an AT role." (ETO)

130. Limited Depression. "Limited depression of the 90-mm gun may necessitate canting the base of the gun forward to cover a downhill slope effectively." (ETO)

131. Occupation of Position. "Speedy occupation of position is a combat necessity. No matter how well a battery can shoot, it can't shoot well enough unless it can move itself quickly and efficiently and install itself tactically and administratively without delay or confusion. All the reconnaissance in the world is useless if the battery fails to occupy position promptly and properly." (SAIPAN)

132. Orientation and Synchronization. "Insufficient attention is being paid to checking orientation and synchronization. Any method of orientation and synchronization should be checked by a different method. Two methods should agree within one mil. CAREFUL CHECKING MEANS GOOD SHOOTING." (ETO)

Chapter 3

AIRBORNE

133. "Combat Experience in airborne operations to date has produced no basic alteration of accepted principles respecting the employment of airborne forces. To the contrary, it has strengthened belief that principles originally set forth in the War Department TC 113, WD, 1943, and now incorporated in FM 100–5, are basicly sound and, if accorded proper consideration in the planning and execution of airborne operations, will offer the maximum prospect of success. The theory that these troops must be relieved in three to five days is modified to hold that these units should be relieved as soon as practical in order to expedite refitting and reorganization promptly for ensuing airborne requirements. Experience in combat has shown that seldom, if ever, will the exigencies of normal combat conditions permit such prompt relief." (ETO)

ATTACK

134. Air Support. "An airborne operation needs a maximum air support, before, during, and after the landings. The success of this operation, as a daylight operation, was due largely to the excellent air support given before and during the landing." (ETO)

135. Air Support. "In daylight, parachute serials should be immediately preceded by fighter-bomber strafing and dropping of light fragmentation bombs, the same principle as following an artillery barrage at 100 yards on the ground. The stunning effect of these bombs on the enemy will permit initial waves of parachutists to land and take up ground fire to protect subsequent waves." (ETO)

136. Communications. "It is believed desirable to have an officer of the troop carrier command arrive with the first echelon of gliders. He should be provided with a radio set capable of directing communication with a control station at the departure airfields. In this way he could transmit on-the-spot information as to weather conditions, the tactical situation, and the glider fields that are clear for the reception of glider lifts. It is believed that many airplanes were unnecessarily shot down by fire from enemy held strongpoints which would have been destroyed had the latest information on the tactical situation been given the pilots." (ETO)

37. **Operations, Drop and Landing Zones.** "The careful selection of rop and landing zones probably has more bearing on the successful ıtcome on the ground phase of an airborne operation than any other .ctor considered in the operational planning. Their proximity to the)jective, to cover and concealment, and to terrain of high tactical factor ır dominating the enemy immediately upon landing, must be carefully)nsidered. I believe that the parachute drop zones and glider landing)nes, and resupply drop areas, should be identical whenever possible, : very close to each other. Even with a minimum of enemy resistance, is impracticable to fight a mile outside the perimeter of a defense, in rder to secure temporarily a resupply area or glider landing zone." ETO)

38. Weapons. "Every parachutist should carry a rifle, carbine, or 'ommy-gun and, in addition, a pistol for personal defense. Over-mphasis on collecting equipment immediately upon landing is likely to ause undue casualties and failure of the mission when landing on a efended DZ. The first job on the ground is an infantry job, to destroy he enemy by intelligent fire and movement." (ETO)

DEFENSE

39. "Gliders are vulnerable targets to all types of artillery as they ıust land in open fields. They have a better chance if they land after)arachutists have been on the LZ long enough to securely engage local lefenses. In operations requiring the landing of gliders on LZ's believed o be defended by the enemy, the necessity for a delayed glider landing ıppears to be indicated." (ETO)

RIVER CROSSING

40. "Engineers (parachute) should be trained in stream-crossing :xpedients, using only bare necessities. With a few drums, cans, planks, ınd a bit of rope, they must be able to construct a raft capable of supporting a ¼-ton truck. Airborne engineers should be thoroughly :rained in placing of AP mines and trip-flares during the hours of dark-ıess." (ETO)

MISCELLANEOUS

141. Air Support Parties. "Air support parties should be permanently assigned to the division so that they will be fully acquainted with the division personnel and airborne problems. To assign an airborne party just before an operation is not a satisfactory solution to the air support problem. These assigned air support parties should be available to

participate in all ground, as well as airborne operations during the training of an airborne division. Just prior to an operation they should be given an opportunity to become acquainted with air support squadrons that have been assigned a mission of supporting their division." (ETO)

142. Anti-Parachute Defense of an Area. "Riflemen should be instructed to maintain a constant fire on parachutists, leaving the larger targets (i.e., the gliders) to heavier guns. The parachutist, in landing, is a vulnerable target and easily disposed of by intelligent use of small-arms fire. However, a few minutes after he lands and joints up with comrades, the very dispersal of these groups enables him to concentrate a volume of fire on any fixed defense. Anti-parachute detachments should be taught to make bold sallies from their defenses to wipe out these initial, small, disorganized groups." (ETO)

143. Parachute Training. "Slipping is an essential part of parachute technique. The argument that you cannot slip far enough to make any difference is not always true. Thirty yards, in my case, was very important." (ETO)

144. Pilots. "Glider pilots must be well-trained ground soldiers or they will not live long. The banding of these pilots into compact ground combat teams is a ground unit training problem. It appears that graduate glider pilots should be organized into battalions, attached to airborne divisions, and live and train with them. They should go into action with the spirit of the infantry, to leave their gliders prepared for offensive ground action. The early stage of airborne action is no place for observers. Every man wants to get into the fight. The glider pilot should be trained and organized to do so." (ETO)

145. Replacements. "Opportunity must be given for airborne units to absorb and to train replacements before being committed to an operation. It is believed that eight weeks is a minimum period for this purpose." (ETO)

146. Training. "All parachutists should be oriented in opening and closing the breechblock and the loading and firing of light artillery weapons." (ETO)

147. Training. "All parachutists should be trained in loading and lashing of equipment in cargo gliders and in the loading of equipment bundles for aerial delivery. Parachute officers should be trained in the loading and dropping of equipment from pararacks." (ETO)

Chapter 4

CAVALRY

SCOUTING AND PATROLLING

8. "Advance Notice to Patrols Is Essential; they need time for aking the necessary contacts with friendly outposts and arranging tails." (ETO)

9. Check Lists Should Be Used for Patrols. "In addition to early d detailed planning, the interrogation system should be employed · S–2 and S–3, using written forms for conveying and recording formation." (ETO)

0. Dismounted Patrols. "When mounted movement is halted by tillery or small-arms fire, dismounted patrols must be pushed forward gressively to locate the enemy main positions." (ETO)

1. Hold Ground Cheaply Gained. "Patrols should occupy and hold lls and bridges found to be unoccupied by the enemy, instead of com- g back and merely reporting the fact. Otherwise later units may be et with fire when moving forward to occupy the 'unoccupied' objec- ve." (ETO)

2. Horse Patrols. "As an expedient, a provisional squadron of valry was formed to conduct more thorough and rapid reconnais- nce." (MTO)

3. "Identification of Enemy Dead while under fire can be facilitated straddling the corpse with a tank and pulling it up through the cape hatch." (ETO)

4. "Jap Soldiers Have a Distinctive Odor; detection and recogni- on of it by a patrol member may prevent ambush." (SWPA)

Figure 8. Mounted reconnaissance patrol.

155. Mines. "Never move a vehicle up to a building without looking for a mine on the surface of the ground or for a cord leading into the building." (ETO)

156. Native Information Cannot Always be Relied Upon. "For accurate information, consult maps and study the terrain." (ETO–SWPA)

157. Night Patrols. "Whenever possible, each unit should hold out a reserve during the day with a view to have available fresh personnel for necessary night patrol assignments. This practice will pay off in increased effectiveness of dismounted patrols at night." (ETO)

158. Radio Reconnaissance. "Valuable road and bridge information can be obtained quickly by simply changing the crystal in the SCR–510 on the reconnaissance platoon quarter-ton so that it can communicate with artillery liaison planes." (ETO)

159. Signals. "Do not use bird calls on the battlefield. After a battle, all birds are gone. Cats and dogs will remain in the area; therefore, dog barks and cat howls, if well done, are good signals." (ETO)

160. "Size of Patrols should be carefully determined considering not only the mission, but other circumstances. The patrol should be small enough to escape detection or large enough to fight its way out of any difficulty. Never let one man go out alone." (ETO)

ATTACK

161. Artillery Coordination. "An artillery liaison officer was detailed to and was with each rifle troop on the front line. These officers rendered most valuable assistance in getting artillery support when and where it was needed. Wire communication was maintained between units being supported and the supporting units regardless of size. Very close coordination was maintained between division headquarters and division artillery headquarters." (LUZON)

162. Forward Observers. "All officers should be capable of adjusting artillery fire by the forward observer method." (ETO)

163. Mines. "Keep close to a retreating enemy to force him to do a rough job placing his mines. This facilitates their discovery and removal." (ETO)

164. "Reconnaissance Radio Reports must be quick and by voice during exploitation or pursuit operations. Time does not permit C-W and cryptography." (ETO)

165. "Road Blocks hastily assembled of wrecked vehicles and other material can be quickly reduced by skipping HE under them. This will set off all mines and booby traps, thereby assisting in the reduction of the road block." (ETO)

166. Sketches. "OP personnel must submit sketches of the exact area under their observation. These sketches must reach unit headquarters as soon as possible after the occupation of the position." (ETO)

MISCELLANEOUS

167. Combat Methods. "The division followed the book. Methods outlined in training manuals and field service regulations were found

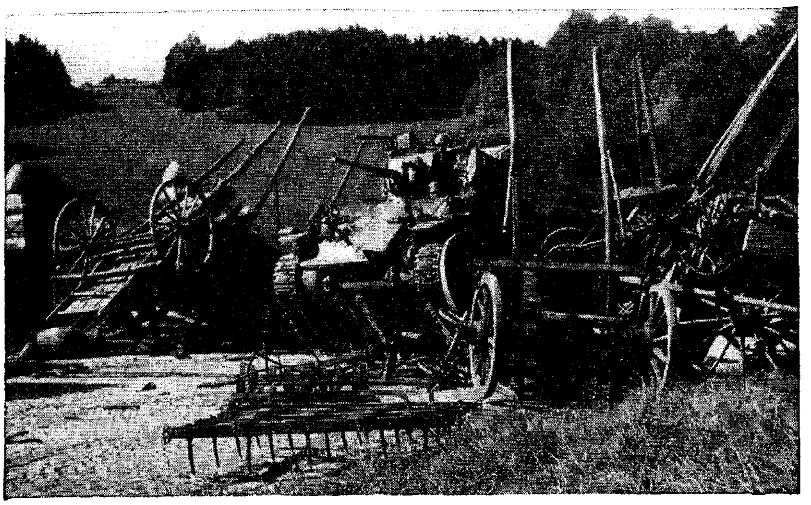

Figure 9. Road blocks.

to be sound. It is true that these methods must be applied practically. The expression, 'Throw the book away,' did not apply in this operation. Simple, carefully thought-out plans worked and brought highly satisfactory results." (LUZON)

168. Communication. "The runner or motor messenger proved to be the most reliable. Due to excessive rains, telephone lines went out many times. However, the telephone proved to be very efficient even under those adverse conditions. The radio was in and out. Sometimes it worked nicely, at others it was useless. The SCR–300 proved itself to be very useful. The field artillery SCR–608 frequency modulated set is a very efficient set so long as it is not interfered with by hills or other obstructions. Teletype and telegraph were highly efficient." (LEYTE)

169. "Dismounted Squads can be formed from overstrength in personnel in the division reconnaissance troops and can be employed effectively by attaching a squad to each platoon. Mounted in a half-track, the squad can precede the platoon until it reaches a possible enemy defensive position. Dismounting, the squad should move forward on foot until it draws fire, at which time it can withdraw under the protection of the platoon. This system reduces the loss of personnel and equipment." (ETO)

170. "Escape Hatches in the M5 light tank may jam in an emergency. This can be overcome by wiring the hatch closed. Men inside can untwist the wire." (ETO)

171. Morale. "Morale was high all the way through. Even the toughest going failed to break it. This division believes in itself and goes in to win regardless of consequences." (LEYTE)

172. Night Vision. "During a period of inactivity we tested all personnel for night vision. Our equipment was improvised but it enabled us to make comparisons. We are now able to pick men for important night missions with some regard to their nocturnal visual ability." (ETO)

173. Organization. "The reconnaissance squadron is a task force. The need for a horse troop, a pioneer and demolition platoon, and a dismounted element carried in half-tracks was felt seriously during the Tunisian, Sicilian, and Italian campaigns." (ETO)

174. "Prisoners must be kept at least 30 yards away from tanks. Do not allow prisoners to mill around or get behind the tank. Keep them in front at all times with the machine gun trained on them." (ETO)

175. "Radio Repair can be done by the squadron in a ¾-ton truck converted into a radio repair shop." (ETO)

176. Radios. "Tiny Tims can be batted fast to armored cars and half-tracks to assist the motor in recharging batteries of radio vehicles that are used constantly. They may also be used as a temporary expedient to keep a radio going on a faulty charging system until repairs can be effected." (ETO)

177. Smoke. "Discarded enemy rifles can be attached to tank turrets and fitted to fire WP grenades as a means of laying smoke rapidly. The grenades can be shot to ranges from 10 to 100 yards by adjusting the elevation of the rifles." (ETO)

178. Snipers. "In areas infested with snipers, portable periscopes may be used to locate snipers in rear of the vehicle." (ETO)

179. Supply. "The division must be trained and ready to use ground, water, and air facilities for supply." (ADMIRALTY IS.)

180. Tanks. "Tanks were used but little. The terrain in general was highly unsuited for them. It was either a swamp or a mountainous area . . . Medium tanks appeared to be able to go any place that a light tank can go and seem to be far more effective." (ADMIRALTY IS.)

181. "Training should be complete enough to enable performance of infantry, engineer, artillery, attack or defensive missions." (ETO)

182. "Training should include more infantry tactics. Cavalry cannot rely on sneaking and peeking methods; it has to fight to obtain information." (ETO)

183. Weapons. "The 81-mm mortar and the BAR proved to be the most popular weapons." (LEYTE)

Chapter 5

COAST ARTILLERY

DEFENSE

184. "Concrete Structures limited damage resulting from bombs, suggesting that all buildings on a fort should be constructed of reinforced concrete. The overhead cover of seacoast battery ammunition galleries were ample to stop bomb penetration." (CORREGIDOR)

185. "Harbor Defense Installation and employment should be modified in design but they still retain great potentialities for the defense of harbor entrances which must be permanently and continuously denied to the enemy. If friendly air support can be afforded, these defenses would become even more potent than in the past." (CORREGIDOR)

186. Locating Enemy Guns. "Good results can be obtained by taking the line of fall of duds and studying a fire-control map of the area." (POA)

187. "Star Shells can be employed to search for naval targets. After the target has been sighted, searchlights should continue the illumination." (SWPA)

188. Target Location. "Use of the water area method in locating and assigning targets should be replaced by the grid system in common use in the area, which permits information obtained from the Navy or Air Warning System to be promptly utilized." (SWPA)

189. "Telephone Communications on fortresses are extremely vulnerable. All telephone cables should be laid at least ten feet underground or have equivalent protection. Main switchboards should be placed in protected locations, and provision should be made for numerous spare cables." (POA)

190. Turret Guns. "The 14-inch turrets at Fort Drum kept up a continuous fire on Bataan. They were still firing 5 minutes prior to the surrender. The value of the turret guns can be appreciated when it is

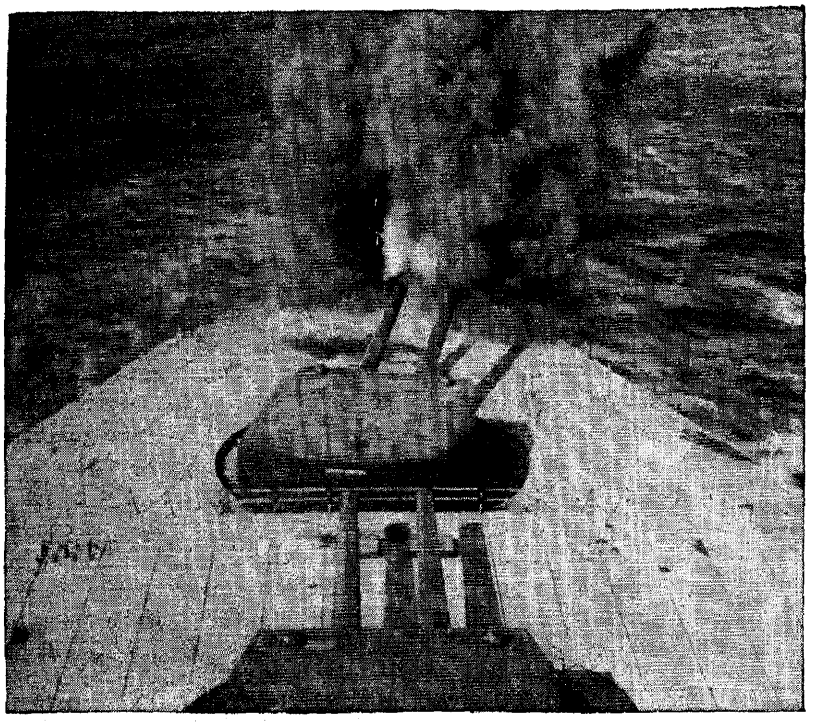

Figure 10. Fort Drum.

realized that, at one time or another, all guns on the fortified islands were rendered inoperative, with the sole exception of the 14-inch turrets on Fort Drum. In one day Fort Drum received over 1,000 direct hits on its deck (105-mm, 150-mm, and 240-mm shells).

Throughout all this shelling, the 14-inch turrets were never out of action. Over 15 feet of the reinforced concrete deck of Fort Drum was whittled away by the time of the final surrender, but this fort suffered few casualties and did excellent work." (*Note:* To recapture Fort Drum in 1945, American forces were obliged to drench the fortification with inflammable oil and set it afire.) (CORREGIDOR)

191. Water Supply. "There exists a need for standby water supply facilities in island fortresses." (POA)

MISCELLANEOUS

192. Radar Surface Ducts. "Action reports from the East China Sea and Nansei Islands area indicate that the existence of surface ducts in the atmosphere is much more common than hitherto supposed. They

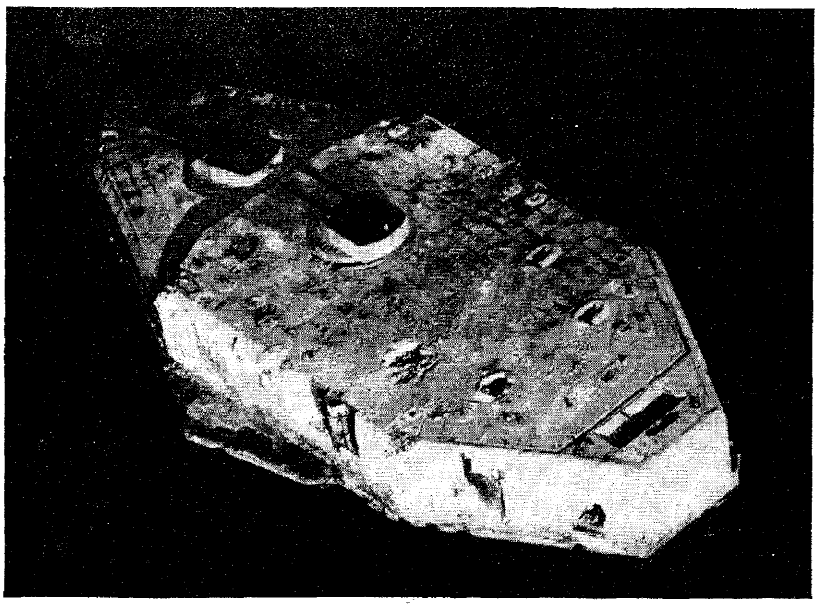

Figure 11. Fort Drum, after being battered by both Japs and Americans, still shows its guns.

occur often enough to offer convincing evidence to prove the case for the use of micro-wave radars at low antenna heights (under 50 feet) as a supplement to other radars." (SWPA)

193. Smoke Shells. "Because of dense vegetation, HE bursts may be barely discernible. Sufficient smoke shells should be included in original ammunition allotment to facilitate spotting on land targets." (SWPA)

194. Surveillance Radar Coverage. "The SCR-682, if located at heights between 1,000 and 2,000 feet, will give reliable coverage capable of detecting planes between the surface and 5,000 feet in altitude to a range of 80,000 yards." (POA)

195. Training in Field Artillery Mission. "When operating as field artillery, it is necessary to adopt field artillery adjustment methods and to learn field artillery fire commands. Air spotters or ground observers from other units may adjust or even direct fire for any battery, and the adjustment procedure and fire commands *MUST BE THE SAME*. Additional training should be given all seacoast artillery units in their secondary mission of field artillery." (SWPA)

Chapter 6

INFANTRY

196. "It has not been found that there has been any change from the classic role of the infantrymen; namely, to close with the enemy, defeat him, destroy him, and seize ground." (ETO)

SCOUTING AND PATROLLING

197. Ambush Patrols. "We have a definite, alerted 'ambush' patrol in every company or platoon area. When enemy patrols contact our lines, this patrol leaves our area and gets behind the enemy, ambushing them on the return trip." (MTO)

198. "Artillery Liaison Planes were used to 'lead' patrols to a designated spot in the jungle by the patrol's setting off smoke pots and by the observer's giving a direction and distance to the designated area." (SWPA)

199. Artillery Support. "All patrols should carry smoke pots or smoke grenades. The release of these signals, with artillery OP's taking azimuth readings on them, will give the patrol's location and greatly facilitate the delivery of supporting artillery fire. When calling for artillery support, the patrol should move to a flank, if possible, to get out of the line of fire. The practice of dropping back 300 to 400 yards along the probable direction of fire to avoid 'shorts' should be discouraged, since such a move is time consuming and delays delivery of the desired support. A red smoke signal may be used to mark the patrol's position after making the move." (SWPA)

200. Artillery Targets. "Colored smoke grenades are issued to patrols. These grenades are equipped with engineer chemical delay igniters of the twelve-hour type. The patrol leader, when observing within the enemy lines some objective that needs the attention of our artillery, simply places one or two colored smoke grenades in position, initiates the chemical delay fuzes, and upon returning, reports the approximate location of the enemy installation." (MTO)

201. Azimuths. "Even though terrain features are available to guide on, azimuths of proposed routes should be studied. Knowing the azimuth helps in checking location and in selecting new routes in case of unexpected occurrences." (ETO)

202. Compass. "Equip each member of a patrol with a compass, and be sure that everyone knows the back azimuth to his own lines." (SWPA)

203. "Draws are easy terrain features to follow, but experience has taught us to work on the ridge, or halfway up it, guiding on the draw rather than traveling along its bottom. The enemy usually covers the natural approaches with fire." (ETO)

204. Formations and Routes. "Never move along trails unless absolutely necessary. If moving in the same direction as the trail, travel parallel to it, and from 75 to 100 yards to the flank, sending small groups into the trail every 100 or 200 yards to reconnoiter. Move in a column of files, two scouts well to the front, with flank guards and small rear guards. The distance between men in the column is determined by the visibility; visual contact is maintained at all times. Under no conditions should the patrol leader be at the head of the patrol; he should be at least the fourth man in the column. If it is necessary to move on the trails, scouts must be well out in front and instructed to move very slowly, stopping every few minutes to listen for any unusual sound. When crossing trails, post guards on the edge of the trail and as far from the crossing point as possible in order to give timely warning of approaching enemy. The patrol must cross the trail individually and rapidly. Whenever a halt of any duration is made, the perimeter should be established immediately, with scouts out. Never halt directly on the trail—always move to one side." (SWPA)

205. Interrogation. "Returning patrol members should be carefully questioned by experienced officers. On one occasion a patrol reported that nothing of value had been observed. Questioning revealed that one man had seen a number of dead sheep. Another patrol was sent to this area and found a mine field." (ETO)

206. Mountain Patrols, Orienting at Night. "It is very difficult for a patrol to keep oriented in mountainous terrain, especially at night. One method is to arrange with the direct support artillery battalion to fire a round of smoke every 30 minutes at a predetermined point for the patrol to guide on." (MTO) (See C 2, FM 21–75.)

207. "Native Guides are undesirable as soon as men are mountain-trained. Such guides know only paths, and thus may lead parties into ambush. It is better for patrols to find their own way, even at the risk of time loss." (MTO)

208. Night Patrol Routes. "A German prisoner reports the following to be the 'basic' error of American night patrolling tactics: 'Whenever an American night patrol is fired upon after it has penetrated German lines it changes its route and moves parallel to the main line of resistance instead of continuing on the original patrol route with a slight offset. In this way the patrol risks running the gauntlet of fire all along the main line of resistance.'" (ETO)

209. Night Patrols. "Night patrols were successfully employed by sending such patrols as far forward as possible in daylight, instead of having them leave battalion headquarters after dark, and thus enabling them to make a visual reconnaissance during daylight. The patrol ate and rested until about 2030, to let the Germans go to sleep, and then proceeded on its mission. Half of the patrol returned with information, leaving half in observation for daylight hours. This half patrol returned the next night." (MTO)

210. Officer Patrols. "There should be very limited use of officer patrols. The number of infantry officers is limited, officer casualties in battle are high, and they cannot be expected to perform aggressive duty all day and then go out on patrols for several hours at night." (MTO)

211. Preparations. "Briefing of the patrol should take place about 12 hours before departure, in order to give all members an opportunity to think over the points covered. Following the briefing, an inspection should be conducted of personnel, weapons, and equipment to determine if members of the patrol are physically able to perform their missions, and that weapons and equipment are in working order. All weapons should be test-fired at this time. From 15 to 30 minutes prior to departure, the patrol should again be assembled for a final inspection and all personnel given an opportunity to ask questions." (SWPA)

212. Rations. "For ease of carrying, K-ration components should be removed from the cartons prior to departure on patrol." (SWPA)

213. Regimental Patrol. "A 'battle patrol' composed of young volunteers can be organized within each regiment to perform special combat

missions and to supplement the work of the I & R platoon. The patrol may be divided into seven teams of five men each, with a headquarters consisting of one officer, a platoon sergeant, a supply corporal and two operation clerks. The patrol should be excused from all duties except their special training, and may be given privileges such as three hot meals a day when not in action and hot baths frequently. The excellent results of such an organization are due mainly to good teamwork, high morale, a very careful prior study and planning of each action, briefing, and an opportunity to study the terrain from an OP for about 4 hours. When a number of teams are sent on the same mission, one should follow the other to assist in case of trouble. Use phase lines for control. When a single team is used, one man stays at an OP and four go forward. The 'battle patrol' should be made available to any battalion which may have a suitable mission for it." (MTO)

214. Return. "Many patrols have successfully accomplished their mission only to lose personnel by a hasty, noisy withdrawal. Patrols go out at night stealthily with all precautions, but all of that is forgotten in getting back to safety. Remember, it is as easy to get hit in the back as in the belly." (ETO)

215. Searching Enemy Dead. "Advance elements of the patrol should never search enemy dead. Designated personnel farther back in the column should be charged with this duty. Before the search is started, a small perimeter should be formed around the bodies, and then a systematic search conducted." (SWPA)

216. Telephone Control. "Sound-powered field telephones and a mile of field wire on half-mile spools were carried by each patrol. At dusk, each of the six patrols would hook into the battalion switchboard and proceed along the prescribed route to the end of the first spool. Each patrol would then check in, using prearranged identification numbers, and receive any further orders. Calls would be made for each successive half-mile check point. Patrols could talk to each other through the switchboard and sometimes could coordinate their movements to take aggressive action against enemy groups or installations in the area." (ETO) (See C 2, FM 21–75.)

217. Training. "New men should not be attached to a patrol for the purpose of gaining experience. They should acquire experience first by sending them out on practice patrols a short distance to the front—even as little as 100 yards at first. This distance can be increased each night until the patrol has acquired considerable experience." (MTO)

218. Wire Lines. "Our patrols should make a special effort to locate and report the location of enemy telephone lines that can be tapped by our forces. When it is not intended to tap the enemy lines, they should be destroyed, and cut-out points booby-trapped." (MTO)

ATTACK

219. Artillery. "When troops are brought under artillery or mortar fire, they *must* move forward between rounds. They must never be permitted to withdraw. It ruins morale and makes control impossible. Men must be made to understand that the closer they come to the enemy, the more difficult it is for him to get artillery and mortar fire on them." (ETO)

220. Barbed Wire. "When crossing low barbed wire, step on the wire at the point where two strands cross—don't try to step in the opening." (ETO)

221. Bazookas with Artillery Fire. "When supporting artillery fire lifted, bazookas were used to give the impression of continuing artillery fire. This enabled the infantry to move close to the enemy positions without receiving small-arms fire." (ETO)

222. Casualties. "Battalion commanders must not fully believe the first reports of casualties in the battalion's first action. They will be exaggerations. Officers and men should be warned of their own natural tendency in making reports, particularly in the first battle, to exaggerate." (NATO)

223. Control. "The location of command posts and the combat positions of commanders and staffs should be influenced by communication facilities and what is 'best for the most'. Too often commanders are obsessed by the idea that they should be 'up front'. One can see a squad or platoon in action from firing positions, but not a battalion or regiment. Control of the larger unit cannot be maintained from the viewpoint of the small unit." (ETO)

224. Coordination. "If, in a coordinated attack, any unit fails to get away in time, higher headquarters must notify adjacent units of the fact." (ETO)

225. Depth. "Failure of commanders to provide sufficient depth in combat formations leads to overemphasis on lateral contact. A com-

mander hesitates to advance for fear of exposing his flank. If his formation has depth, his flank will be secure." (ETO)

226. Evacuation. "One of the reasons a soldier dislikes making a night attack is that he fears being wounded and overlooked in the darkness. Attaching luminous tape or markers to the men would help overcome this feeling." (ETO)

227. Formation. "Our battalion used a triple point. Each consisted of a scout, a light machine gunner or automatic rifleman, and two or three riflemen selected for their aggressiveness. The points were supported by a moving base of fire which included two or three bazooka teams and some men prepared to fire the 60-mm mortar individually. This moving base was followed by an assault force of a company (or strong platoon) which mopped up. The points pushed forward rapidly. When one was stopped, the others outflanked the opposition. All three were never stopped simultaneously. The formation was particularly effective in compartmented terrain." (ETO)

228. Fox Holes. "When fighting for limited objectives in woods we cut and piled a stack of logs near the line of departure. These can be brought forward quickly to provide overhead cover for newly dug fox holes." (ETO)

229. Mines. "Tanks supporting infantry have helped by exploding antipersonnel mines. The explosion does not injure the tank, which precedes the infantry advance, the infantry following in the tank tracks." (NATO)

230. Mines and Booby Traps. "Mines produce a greater effect on the mind than on the body. There is a very real danger of troops becoming too mine conscious. When mines are encountered, there is a tendency to sit until they are removed. Since the purpose of the mine field is to delay us, the thing to be avoided is delay." (MTO)

231. Mortar Adjustment by Salvo. "To get quick adjustment on targets by mortars it is common to fire an initial salvo with three mortars. One mortar fires at each of the following ranges: estimated range, 50 yards short, 50 yards over. This gives quick adjustment, and fire for effect can be started on the second salvo." (MTO)

232. Mortar Adjustment by Sound. "Many times it is advantageous to adjust without observation. Teach men to adjust fire by sound. It's a good trick, and it can be done." (ETO)

233. Mortar Aiming Stakes. "We no longer carry aiming stakes, but use the tie rods that come with ever cloverleaf of ammunition." (MTO)

234. Mortar Carrying. "Carry the base plate in front—it will stop a lot of shell fragments. To carry the tripod easily, spread the legs and carry one leg on each shoulder." (ETO)

235. Mortar Location. "All 60-mm and 81-mm mortars used in support of an attack should be in firing positions on hillsides—never in the bottom of draws. The Germans prepared artillery and mortar fires on all draws forward and to the flanks of their battle positions." (ETO)

236. Mortar Registration. "Prior to an attack, do not allow your mortars to register on any target from their attack firing position. Have them register from positions several hundred yards away and calculate the changes in data required to hit the targets from the attack positions. Start the artillery firing on the enemy's forward positions; then shift the artillery, and have the mortars fire on the forward positions. The noise of the artillery covers the mortar fire and makes it harder for the enemy to locate the mortars." (MTO)

237. Mortars. "When covering an area target with 81-mm mortars, we wait two or three minutes between each group of two or three rounds. This pause gives the enemy time to get up and move around; otherwise, the enemy stays under cover and no casualties are inflicted after the first few rounds." (ETO)

238. Mortars, Radio Communication. "We have used the SCR–536 for effective communication between the observer and the 60-mm mortars. The support is not only better, but the mortars can be emplaced where they are safer from enemy fire and where ammunition supply is easier." (ETO)

239. Mortars, Wire Communication. "In the rifle company command group, I always had the mortar section sergeant and one man with a roll of W–130 wire. The 60-mm mortars usually followed the attacking platoons, and when one of the platoons was held up, the wireman began rolling wire back to the mortars, while I pointed out the target to the mortar sergeant. By the time the sergeant had figured his range to the target, the mortars were in communication with him, and the first round on its way. This saved valuable time, since I didn't have to send back for my observer." (MTO)

240. Night Attack, Maintaining Direction. "We used white-phosphorus shells, fired at the rate of one per minute, to provide light to guide

companies to their objectives in a night attack. 50-caliber tracers fired overhead are also helpful to troops in maintaining direction." (ETO)

241. Night Attacks. "A night attack, preferably just before dawn, is the most effective way to take a limited objective, 1,000 to 1,500 yards distant. We feel that unless sustained artillery fire can be maintained ahead of the infantry in such attacks, we would rather have none at all. Short preparations serve only to alert the enemy. To help insure surprise, we allow time for each leader to make a personal check of every weapon in his unit to see that it is locked." (ETO)

242. Night Control. "You must develop practical and satisfactory means of keeping control in mountain operations at night. This is most important in column movements over narrow trails and in night attacks. We borrowed large quantities of gauze bandage from the medics and used it to mark flanks and for trail markers." (MTO)

243. Night Vision. "Grenades and small-arms fire produce flashes at night which temporarily blind the firer. Close your eyes when you press the trigger, or after throwing the grenade." (CBI)

244. Objectives. "Seldom should an attack order give a stream or canal as a phase line or objective. Bridges may be taken intact if some feature on the far bank, rather than the stream itself, is made the objective." (ETO)

245. Reconnaissance. "Platoon leaders should make a second reconnaissance as late as possible before the attack. Five hours before a night attack our reconnaissance showed a stream only a foot deep. But before we reached it, a dam had been blown out, and the stream was unfordable." (ETO)

246. Reliefs. "When it is necessary either to pass one battalion through another or to have a battalion relieve another and then attack, most commanders favored the former (the passing through) operation. No confusion resulted if the relieved battalion stayed in its holes until the relieving battalion had cleared. Arrangements were usually made to have the heavy weapons of the relieved battalion initially support the advance of the relieving battalion." (ETO)

247. Rifle Company. "I attach the light machine guns to the leading rifle platoons and use them as a base of fire for maneuvering the rest

of the company. When only one platoon is in the assault, I use one gun on each flank. When two platoons are in the assault, the machine guns cover one flank of each platoon, and automatic rifles cover the other flanks. The 60-mm mortars advance in rear of the center of the company, and the observer and wire crew move with me close to the assault units. When we meet opposition, the mortars are set up 200 to 300 yards to the rear, and the wire is run back to them." (ETO)

248. Route. "Never take the easiest route when moving through an area that has been occupied by the enemy. He covers all natural routes by fire or mines or both. Remember that he has already been over the ground and has figured out in advance your likely avenue of approach. If you want to live, seek out the hard way to advance toward enemy positions." (MTO)

249. Safety. "Assaulting infantry should remain at a safe distance from tanks and TD's as the armor draws heavy small-arms and mortar fire." (ETO)

250. Sandbags. "In a counterattack we had each man carry four sandbags tucked in the back of his belt. They were no incumbrance to the men, and they enabled them to build a parapet around their fox holes in a hurry when digging in on the objective. This expedient is particularly useful in heavy rain, which tends to wash away an earthen parapet as fast as you can build it." (MTO)

251. Scouts. "Don't crowd your scouts; give them plenty of time to reconnoiter the terrain." (ETO)

252. Sniper Activities Exaggerated. "Enemy sniper activities have been greatly exaggerated. Most of the bullets alleged to have been fired by snipers actually were ricochets from the front lines, from individuals who were bypassed, and from the weapons of some of our trigger happy individuals." (ETO)

253. Snipers. "When attacking over a considerable distance we have one man per squad follow at 75 to 100 yards to protect against bypassed snipers." (ETO)

254. "Snipers should never be allowed to hold up the advance of a unit. Dispatch one or two men to hunt them down. They themselves cause fewer casualties than the enemy artillery fire which comes after men have been pinned down by snipers." (ETO)

Figure 12. Don't be pinned down by sniper fire.

255. Snipers. "We have had a lot of trouble with snipers in trees. You can't see them, so we have the tanks run into a suspected tree and shake them out. Then we have the nearby infantry pot them." (ETO)

256. Supporting Weapons. "Mortars and light machine guns attached to rifle platoons should move far enough behind them to avoid being pinned down by the fire which stops the platoons. If they should be immobilized, operations will be held up, and smoke may be required to permit their withdrawal." (ETO)

257. Surprise Attack without Tanks. "Sometimes a surprise attack without tanks will succeed when an attack with tanks would fail, because the tanks draw intense artillery fire on the infantry before the attack has a chance to get started." (ETO)

258. Tank-Infantry. "Don't let the infantry bunch up behind tanks. Mortar fire is likely to come down which will not bother the tank but will cause casualties among the infantry." (ETO)

259. Tank-Infantry. "Regardless of the initial formation it is *not* essential that tanks and infantry keep their respective positions throughout an assault. A tank must stop to fire effectively, and that is the time for the infantry to press on. Infantry may be stopped by

machine-gun fire and, unless the enemy antitank defense is strong, that is the time for the tanks to press on. Both arms must realize the fact that if one stops, that is not a reason for the other to stop." (ETO)

260. Tank-Infantry. "Accompanying infantry should avoid passing through the same openings that a tank has just used, as the enemy will usually be laying on these openings as soon as he discovers them." (ETO)

261. Tanks. "Too many of our infantrymen don't understand that when they have tanks supporting them they must protect the tanks. They've got to keep right up with the tanks and protect them from enemy armed with bazookas or hollow-charge grenades." (NATO)

Figure 13. Infantry protects the tanks.

262. Targets. "There is a tendency among riflemen to wait for definitely visible targets before firing. Each man must learn to cover with fire his sector of any target believed occupied. Men must shoot and move." (ETO)

263. Tree Bursts. "The rocket and the rifle grenade are very effective against enemy dug in along a tree line. A hit on a tree trunk above his emplacement is particularly effective. The same is true of tree bursts with the 60-mm mortar." (ETO)

54. All-Around Defense. "Emphasis must be placed on all-around efense and on the use of reverse slopes. Men must be made familiar ith the feeling of being surrounded and learn not to be alarmed by iemy infiltration." (MTO)

55. Antipersonnel Mine. "A very effective antipersonnel device may e constructed with oil drums filled with scrap metal packed around angalore torpedoes and electrically detonated." (SWPA)

56. Artillery. "Stress getting the artillery observer up at once and aving him register his battery on all dangerous approaches. Make him o this before he fires at any targets of opportunity, no matter how mpting." (NATO)

57. "Bangalore Torpedoes 60 to 80 feet in length have been used in ie defense. They are pushed straight out in front of the forward ositions. Only the half nearest the enemy is filled with explosive. When ie enemy assaults and they are fired from the forward positions they ave a devastating effect." (MTO)

68. Command Posts. "The sentry guarding a shelter or dugout can over the entrance most effectively from a fox hole 25 to 50 yards from ie shelter. Germans who infiltrated and attempted to rush our CP's ere easy targets for guards so placed." (ETO)

69. Conduct of the Defense. "You must be constantly aggressive; ou must dominate no-man's land from the beginning. You must send ut aggressive combat patrols to eliminate every outpost which he ushed up close to your front-line positions. When he has been pushed ack, you can really hit him with artillery and mortars." (MTO)

70. Counterattacks. "The best way to break up a counterattack is to top it before it starts. Before you ever start your attack, study your ap and aerial photos and figure out the routes of approach which the nemy will probably use to counterattack you after you capture the bjective. Also figure out where the mortars backing up his position ust be located. Get things all set in advance so that you can slap rtillery on his mortar positions, and can comb his routes of advance vith mortar fire, right after you capture the objective. A few shells round his mortars and mortar shells dropping all along his possible outes of advance frequently discourage him from counterattacking at ll." (NATO)

271. Fox Holes. "We use a three-man fox hole to give our front-line soldiers maximum protection from cold, rain, and hostile fire. Except when under fire, one man remains alert outside the rear entrance, while two are resting. The holes are 8′ x 4′ x 6′, covered with four layers of logs and dirt, and camouflaged. Three fire slits and a fire step are prepared on the forward side. Entrance is by a small hole in rear, which is kept covered by a shelter half or blanket. Cardboard box tops or other salvaged material is used to keep out the rain, and pine boughs or dry grass are placed on the floor." (ETO)

272. Harassing at Night. "The passive complex is easily acquired when your troops are on the defensive. One way of combating it is to harass the enemy at night in every possible way." (MTO)

273. "Machine-Gun Fire on Tanks will draw their fire. Instead, use rifle fire to button up the tanks and concentrate the machine-gun fire on the accompanying enemy infantry. Meanwhile, maneuver bazookas to get a shot at the tanks." (ETO)

274. Mine Laying. "We have used artillery fire to pin down the enemy while laying hasty mine fields. On one occasion we laid a field within small-arms range of the enemy without casualties." (ETO)

275. Mortar Adjustment. "In a defensive situation, we send up an 81-mm mortar observer in an observation plane to register on targets defiladed from ground observation." (ETO)

276. Night Illumination. "During a night attack, we fired white-phosphorus shells beyond the main attacking body. The enemy troops were thrown into bold relief, and our machine gunners were able to break up the attack with aimed fire." (MTO)

277. Night Illumination. "Means of illumination at night included searchlight beams directed against low-hanging clouds so as to reflect light along our wire; thermite grenades hung in trees 10 to 12 feet in front of the wire and actuated by pull wires; cans filled with sand and saturated with gasoline and oil mixture and ignited by thermite grenades. The standard 18-pound airplane parachute flare Mark IV, Model 3 (850,000 candlepower) gives the best light for ground illumination. Parachutes are detached, and the flares tied in trees outside the main line of resistance. Electric wiring is rigged to ignite the flares, so that closing the switch produces a brilliant light lasting three minutes." (SWPA)

278. "Outguards must be alert, and should not make themselves so comfortable that it is easy for them to go to sleep." (ETO)

279. Reliefs. "The relieving battalion takes forward its own 81-mm mortar tubes but uses the baseplates of the relieved unit. It carries its own machine guns but uses the tripods of the relieved unit. It also takes over the 37-mm guns of the relieved unit instead of bringing up its own. All this helps to expedite the operation and tends to preserve its secrecy." (MTO)

280. Rifle Rests. "So that riflemen can fire in specified directions at night, rifle rests are essential. Forked sticks will do, but they are hard to find. Two shell cases, two rocks, or even a mound of dirt will serve. Cut a slit in the ground for the rifle butt, just wide enough to permit the man to cover his assigned sector without removing the butt from the slit. Support squads as well as front-line squads should have these rests." (MTO)

281. Rifle Stakes. "In most cases the Japanese attack at night. Experience in recent operations has proved that the squad leader will probably find it necessary to order that each man set out stakes to mark the limits of the sector assigned to him. When it is necessary to fire at night, each man will be able to feel these stakes and fire effectively within the sector." (SWPA)

282. Roadblock. "Single German tanks, accompanied by infantry, sent out to probe roads at night were trapped in the following manner: An uncamouflaged 'daisy chain' of mines was put across the road about 100 yards in front of a band of carefully camouflaged mines, covered by bazookas and two machine guns. The Germans would remove the 'daisy chain' and then feel that all was clear. When the tank hit the concealed mines, we opened fire on the infantry. If the concealed mines were discovered or if they failed to halt the tank, the bazooka opened fire on the tank, the machine gun on the infantry." (ETO)

283. Small-Arms Fire. "Many men don't realize the fire power of their own small arms. Recently an outpost of four men, located 200 yards in front of the MLR, discovered a German patrol of eight men going across their front 30 yards away. The outpost did not fire for fear of disclosing its position, because it was outnumbered. The enemy could have been eliminated with a few bursts from the BAR and two or three grenades." (ETO)

284. Town Defense. "Common mistakes we make when defending or billeting in towns are failure to post and maintain an all-around alert security against infiltration; failure to maintain tactical unity, owing to dispersion of elements around the town to find sleeping quarters; failure to make advance plans for fires, including artillery, antitank, and mortars, to break up an enemy attack; failure to establish an adequate communication system to alert units for action; failure to use all weapons in the defensive action." (ETO)

285. Tracers. "Prisoners of war attributed the failure of their night attack in large part to the lavish expenditure of tracer bullets by the defenders." (ETO)

RIVER CROSSING

286. Antitank Measures. "Almost without exception, antitank weapons were in earliest demand by forces reaching the far shore. As a temporary antitank defense, some units had the assault infantry carry a certain number of antitank mines, plus extra bazookas with ammunition taken from units scheduled for later crossing." (ETO)

287. Boats. "In the planning of assault boat river crossings, provision must be made for the replacement of lost boats." (ETO)

288. Bridges. "Commanders have a tendency to call for construction of bridges before the tactical situation warrants. They feel that bridges should be constructed immediately after the first or second wave of infantry has crossed a river, because of the usually urgent need for supporting tanks or tank destroyers. They do not realize that M1 and M2 treadway bridges used for this purpose can be easily knocked out. Bridgeheads in some of our operations have been inadequate to prevent this." (ETO)

289. Deception. "To promote secrecy and preserve surprise, reconnaissance parties were usually held to a minimum and conducted their activities with the greatest care in areas under possible enemy observation. On occasion, attempts were made to promote surprise by purposely letting reconnaissance parties be seen in areas where decisive action was not contemplated." (ETO)

290. DUKW's. "In one instance DUKW's were used for ferrying supplies and equipment, including jeeps and trailers. In connection with this use of DUKW's, the following points should be kept in mind: (1) crossing sites should be well away from the intended bridge crossing site

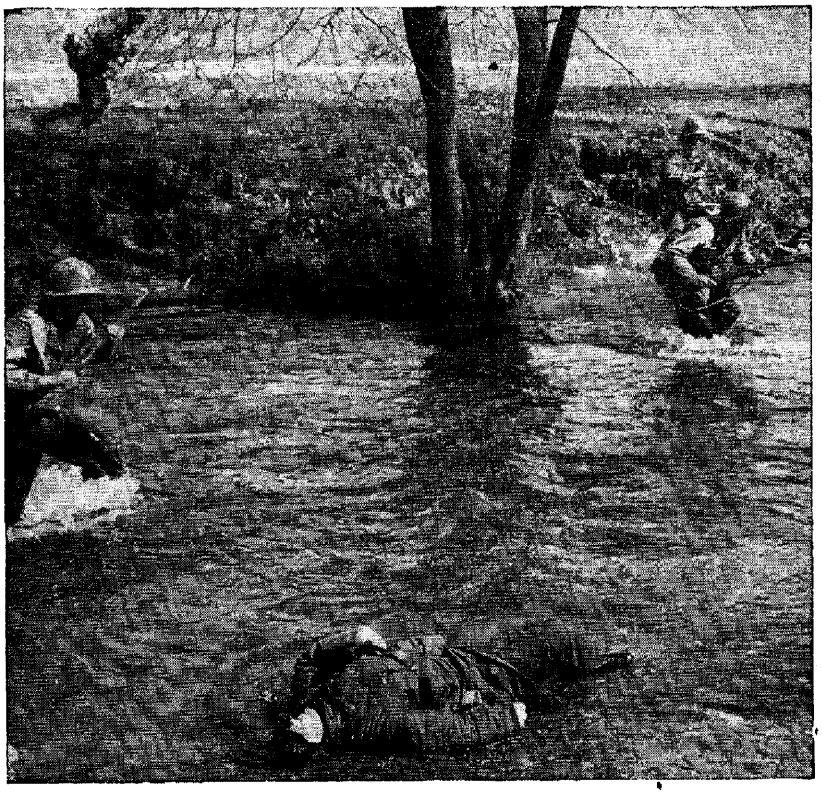

Figure 14. River crossing.

and should be near roads that are close to the stream; (2) ramps should be provided on both banks; (3) a turn-about should be provided on the near bank for loading and on the far bank for unloading; (4) if the current is sufficiently strong to carry the DUKW downstream, both a launching point and a downstream landing point must be selected on each bank." (ETO)

291. Engineers. "Prior to the crossing of a defended river, units which are to make the crossing should, if possible, be withdrawn to a rear area and trained as teams with the engineers." (MTO)

292. "Ferrying duties should be carried out by reserve battalions, never by assault troops." (MTO)

293. Float. "Unfold the gas cape and spread it on the ground. First, place in it the combat pack and any articles of clothing. Wrap up the

individual weapon in clothing and place it lengthwise inside the cape, being careful that no sharp metal parts are touching the end of the cape. On top of the weapon place the gas mask, helmet, cartridge belt or other web equipment, and any remaining clothing. Shake the upper side of the cape opening up and down to get as much air inside the cape as possible, then quickly gather the open end of the cape, closing it like a paper bag. Tie it up tightly with a shoestring or shelter half rope. The bag may now be lifted carefully from the ground and placed in the water. In swimming, the soldier may easily tow the bag by holding the ends of the tied string in his teeth. The bag will provide ample buoyancy for all the individual equipment a soldier carries in combat. The bag will keep a man afloat if he places only his arms over the bag, leaving the remainder of his body in the water." (ETO)

294. Outboard Motors. "To avoid 'warm-up' running, two medical department heating pads were placed on each motor and covered with gas protective capes. These measures were very successful." (ETO)

295. Surprise. "In a number of instances, the speed of the attack was a principal factor in obtaining decisive surprise. Other measures employed to aid secrecy and surprise were: (a) making all preparatory movements under cover of darkness; (b) firing artillery concentrations for several nights prior to the attack, generally similar in nature to those planned for the attack; (c) forcing crossings at times when stream conditions were unfavorable because of excessive rains; (d) selecting crossing sites which it was thought the enemy would regard as unlikely; for example, where an earlier small bridgehead attack had failed; and (e) making feints at other favorable crossing sites." (ETO)

296. Vehicle Priorities. "The priorities prescribed by one unit for crossing its vehicles are believed to be fairly typical and were as follows: (1) reconnaissance; (2) antitank platoons of assault battalions; (3) regimental antitank company; (4) attached tank destroyer battalion; (5) organic transportation of assault battalions; (6) antitank platoon of reserve battalion; (7) cannon company; (8) organic transportation of reserve battalion; (9) attached medical company; (10) field artillery battalion." (ETO)

AMPHIBIOUS OPERATIONS

297. Beaches. "Assault troops must be prepared to land at an unexpected place and to fight on the wrong beach. Battle maps should be carefully studied before the assault, including the areas on either side of the place where it is planned to land. Junior commanders should be

able to identify their positions as soon as they reach shore, and not just assume that they are where they should be." (NATO)

298. Machine-Gun Mount. "The light machine-gun mount can be used more satisfactorily in amphibious operations than the heavy machine-gun mount. The heavy mount is unwieldy and thus more difficult for the men to handle in mobile operations. The light and heavy mounts are interchangeable, and it is recommended that the light mounts be used for both light and heavy guns in the initial stages of establishing a beachhead." (SWPA)

299. Waterproofing Flamethrower Nozzles. "Waterproofing the nozzles of portable flamethrowers by placing a VD protector over them has proved successful in landing operations, especially where heavy surf has been encountered." (SWPA)

300. Weapons. "Crews of weapons and radios must not get separated. If the crew gets scattered upon landing you will never be able to get your weapon assembled and in position. Each crew-operated weapon should have one extra man, so that if one of the crew goes out, the extra man can take his load and proceed." (ETO)

COMBAT IN TOWNS

301. Ammunition. "Each man should carry three extra bandoleers, four fragmentation grenades, and two white-phosphorus grenades. Throw grenades into cellar windows, after holding them for a few seconds to make sure they won't come back." (ETO)

302. BAR. "The automatic rifle should be in the leading echelon and used to give every target a dose of fire, especially before entering a house. This fire must be delivered to cover the riflemen. The automatic rifleman must be able to fire his weapon from the hip as a close-in weapon." (ETO)

303. Basements. "Shoot armor-piercing shells, followed by high-explosive, into the foundations and basement. This will kill most of the occupants, who are usually in basements, whereas shooting higher causes debris to fall to lower floors, thereby giving more protection to the defenders in the basement." (ETO)

304. Burning Buildings. "While a building burns and cools off, it is an obstacle. This period may be from 24 to 48 hours, even longer. And a burned-out building, even with walls standing, is still an obstacle

because it is difficult to cross the wreckage. Therefore, burn buildings, unless they are isolated ones, only as a last resort; for example, when a large enemy force is upstairs and will not give up. White-phosphorus shells from an 81-mm mortar are effective incendiaries. Burn buildings at night, so as to save as many daylight hours as possible." (ETO)

305. Civilian Activity. "If the civilians in a village are going about their daily life in normal fashion, the village is not defended." (MTO)

306. Demolitions. "A bazooka makes a hole in a wall large enough for a man to pass through. In passing from house to house, this method is better for inexperienced men than the use of demolition charges. Antitank grenades, though less effective, can be similarly used." (ETO)

307. Half-Track. "When assaulting villages, we have a rifle squad in a half-track follow each tank at about 25 yards, rather than have the infantry ride on the tanks. Thus a complete squad is available to go into action, and the infantry does not have to dismount every time the tank halts to fire. The ability of the half-track to maneuver in rear of the tank affords the infantry some protection against enemy small-arms fire." (ETO)

308. Identification. "Buildings occupied by our own troops should be marked. Casualties have resulted from grenades thrown inside by friendly troops." (ETO)

309. Loopholes. "Removing a single brick sometimes provided a loophole for firing from a basement." (ETO)

310. Machine Guns. "When we emplace machine guns in ground floors to deliver grazing fire, we put them well back from openings in order to hide the flash and muzzle blast. We also put chicken wire over the windows to stop grenades." (ETO)

311. Mopping up Buildings. "In mopping up a building, riflemen use fragmentation hand grenades, rifle grenades, bazookas, rifle-launched 60-mm mortar shells, and individual automatic weapons. Search each room and every closet; always leave a man on each floor to protect the rear of the searching party. Axes and flashlights should be issued for this work." (ETO)

312. Night Attack. "Careful planning and thorough orientation preceded the attack. Aerial photos were used to familiarize each man with the lay-out of the town and the action to be taken by his squad. To

achieve surprise, the attack was preceded only by normal harassing fires. A line of skirmishers with rifle grenades preceded the battalion and placed mass grenade fire on previously located targets, particularly automatic weapons. The assault company moved rapidly through the town and took up defensive positions on the far side. The reserve company mopped up. The support platoon of the reserve company carried antitank mines which were used as road and bridge blocks. Machine guns and mortars were carried by hand and emplaced rapidly after the objective was reached. The aid men were kept active and well forward in order to counteract the men's fear of being wounded and left until daylight." (ETO)

313. Organization. "I found it best to split the squad into two or three groups and have each group hit a different building simultaneously. After a building has been entered, some of the men should clear it while the others attack the next building. After the objective has been taken, a mop-up group should be organized to return and clear out any enemy who have stayed in hiding, and to search for booby traps." (ETO)

314. Preparations for Attack. "Provide maps and sketches for every man and give each a chance to familiarize himself with the area he is going into; have the leaders make as bold and complete a daylight reconnaissance as possible." (ETO)

315. Rooms. "We use a three-man team in searching rooms—one man with grenades and two men covering him. While entering a building, fire at all openings to keep the enemy down. Speed is essential." (ETO)

316. Routes of Advance. "Platoons and squads used hallways, stairways, rooftops, and basements as routes of advance. Sometimes it was necessary to blow only two or three walls in an entire block. It was found best to cross streets near the center of blocks. To make sure that the doors of buildings across the street were open, the locks were shot away or the doors shot open with bazookas or antitank grenades. The street was then filled with smoke from white-phosphorus grenades, and the men crossed under its cover." (ETO)

317. Searching Buildings. "When a wall is blown, it is not necessary to toss hand grenades through the hole. The concussion and the flying bricks and stone are enough to neutralize the occupants on the other side. A squad or half squad is sent quickly through the hole. It then moves from room to room, floor to floor, always covered by another squad or half squad one room to their rear. Submachine guns are the

principal weapons of the first group; automatic rifles, of the second." (ETO)

318. Smoke. "Ten battalions of artillery placed three rounds per gun on the town of about thirty stone buildings, and then smoked the area. Under cover of the smoke, a company of medium tanks moved in on each flank and fired into the houses. Then the infantry dashed through the town, throwing incendiary grenades into the windows, and dashed out again. Every house burned, and the Germans ran out." (ETO)

319. Squad Objective. "Every man must know his individual mission. In our attacks each man was responsible for a definite objective. When the squad objective has been taken, half the squad should consolidate the position while the other half returns and mops up. We augmented our armament with every automatic weapon we could get." (ETO)

320. Tank Cooperation. "Prior to each forward movement of the infantry, the tanks must place high-explosive and machine-gun fire on all positions known or suspected to be occupied by enemy. The tanks should place fire on all corners of a street intersection before the infantry

Figure 15. Infantry-tank team.

crosses, and down each street before the infantry enters. Thus the advance becomes a series of successive moves, with the tanks covering the infantry at every stage. The infantry, however, must perform reconnaissance for the tanks, scouting all intersections and unexplored streets before the tanks expose themselves. For example, an infantryman observing at a street corner may be able to describe a target to a tank crew giving range, azimuth, and precise location in such a manner that, when the tank moves out, it can find and fire on the target much more rapidly than would be possible if the tank crew did not know what to expect." (ETO)

321. Tank Fire Against Buildings. "When a tank section is working with infantry in streets, assign one tank specifically to fire on the lower floors and another to fire on the upper stories. The firing should be on prearranged signal. This avoids confusion and prevents unnecessary casualties to our troops." (ETO)

322. Tank Riding. "When resistance has been weak and we are able to employ tanks on the flanks or rear of the town, we mount a squad with automatic weapons on each tank and charge into the town with all guns blazing. All supporting weapons are also brought into play. The surprise and shock are effective. The remainder of the rifle company follows on foot and assists in mopping up." (ETO)

323. Tanks Shield Infantrymen. "Machine-gun fire from two modern, strongly constructed buildings to the east swept the open part area between them, so that troops had to resort to a 'shuttle service' of tanks running back and forth across the open space, with foot troops walking on the sheltered side, using the tanks as shields." (MANILA)

ATTACK OF FORTIFIED POSITIONS

324. Air Bombardment. "Best results were obtained if air bombardment took place when the assaulting troops were not more than 1,000 yards from the target, and when they moved in rapidly, as soon as the bombardment was over. Since even this limited advance required valuable time, it was found best to cover the target with heavy artillery fire until the attackers had advanced to a point not more than 400 yards from the target, at which time the light artillery concentration could be delivered, followed immediately by a rapid advance of the infantry. When such tactics were employed, success invariably followed. If, on the other hand, air bombardment took place at too great a distance from the attacking troops, it was found habitually that the defenders

had an opportunity to recover and man their positions before the attackers could arrive. In the final assault, tank destroyers and 57-mm guns, if they could be spared from their primary missions, were found most useful in firing at the apertures of strongpoints to cover the advance of demolition parties." (ETO)

325. Carbon-Monoxide. "Caution should be exercised in allowing men to enter pillboxes on which composition C and TNT have been used for gaining entrance. Some time should be allowed for gases to escape before going inside. Gas masks do not offer protection." (ETO)

326. Caves—Demolitions. "The reduction of cave defense will usually be accomplished by a heavy charge of explosive. The purpose is to produce some cave-in and great concussion effect. Therefore, the size of the charge will depend upon the depth of the position. A 50-pound charge of TNT or equivalent may be sufficient for a cave with small entrances and a depth of not in excess of 50 feet. Five hundred pounds is not excessive for large caves and cave nets, and comparable charges should be exploded at remote openings as nearly simultaneously as practicable. When it can be determined that the roof of a gallery is readily penetrable from the ground above the roof, the placement of drilled charges may disorganize subsurface communications and lighting, produce casualties, and destroy stores." (SWPA)

327. Caves. "Gasoline in quantity poured into windward entrances and ignited by a grenade tends to exhaust oxygen, produce harassing fumes, cause casualties, and destroy enemy ammunition. This method is most effective when the cave or tunnel floor slopes downward from the entrance. Where this occurs, gasoline may be ignited even at leeward entrances with effect." (SWPA)

328. Caves—Smoke. "Remote openings of cave nets may be revealed by smoke shells or smoke rifle grenades bursting at the windward mouths. The smoke will exit at leeward or higher vents, thereby facilitating reconnaissance." (SWPA)

329. Flamethrowers. "Two hundred feet of pipe were connected to a drum of gasoline, to which oxygen pressure was applied. Snaking the pipe to a position nine feet from the Jap held pillbox, the valve was opened, the fuel sprayed the box. The fuel was then ignited by means of a WP grenade." (SWPA)

330. Infantry-Tank-TD Team. "We used small teams of tanks, tank destroyers, and infantry to capture pillboxes. The infantry moved for-

ward until held up by a pillbox. The tanks would then come up and close the aperture with machine-gun fire while the tank destroyers fired several rounds of 90-mm into the fortification. When the infantry started for the pillbox again, the enemy usually surrendered. We had adopted this close formation because of limited routes of approach, poor visibility, and uncertainty as to the pillbox locations, but it proved so effective that we were able to clean out an entire fortified town in one day." (ETO)

331. Night Assault Against Pillboxes. "Successful night assaults against pillboxes were made using the following plan: assault groups consisted of a demolition party of two or three men with three 12-pound satchel charges of composition C, and six to ten men armed with rifles, AT grenades, submachine guns, and automatic rifles. During daylight, assault group leaders studied the terrain and pillboxes, selected routes, and recorded azimuths. Just before the assault, time fire was placed on a number of bunkers, including the ones to be attacked. This drove the enemy inside without indicating exactly which bunkers were to be assaulted. The assault group used AT grenades and other fires to kill guards and button up the bunkers. Men climbed on top of each pillbox and, with a cord, swung a satchel charge into the entrance. As soon as it exploded another satchel charge was thrown into the entrance corridor. In every case this brought the Jerries out." (ETO)

332. Pillboxes. "A successful method of locating pillboxes consisted of directing grazing tracer fire against the suspected area. Artillery placed WP on the point where the tracers ricocheted, setting fire to the camouflage and exposing the pillbox." (ETO)

MISCELLANEOUS

333. Ammunition. "The 105-mm and 81-mm mortar ammunition both absorbed moisture, when taken from the containers, and the firing became erratic. Orders were issued to leave the seals unbroken until just before the firing." (SWPA)

334. Ammunition Packboard. "The normal packboard load of four boxes of .30 caliber MG ammunition is so heavy that ammunition bearers are unable to keep up with their squads. When they lag behind, they are often subject to fire from bypassed riflemen. We found that the bearer can keep up if he carries two boxes on the packboard and one in his hand. The squad leader also carries one box, and thus far we have never run out of ammunition." (ETO)

335. Antitank Gun Mounting. "We mount half-ton truck pintles from salvaged vehicles on the front bumpers of all our ¼-ton AT vehicles. The 57-mm gun can then be pushed, barrel forward, into difficult firing positions with little loss of time and exposed movement." (ETO)

336. Artillery. "The infantryman must learn the types of targets on which the artillery can give the maximum support. He must understand the true value of artillery and not call for support unless the target merits it. He must not cause the waste of valuable ammunition that he may need more on some other target." (ETO)

337. Camouflage. "A common failing among our troops is overcamouflaging. We place so much material over our positions that it creates a darker mass than the surrounding shrubbery and is easily picked up through field glasses." (MTO)

338. Challenging. "Make sure that you have perfect cover when you challenge at night. Many of our challenges were answered by fire, and many lives were lost unnecessarily. Also, we have found that on bright moonlight nights in snow, some sentries challenge at too great a distance and the German in snow camouflage fades away, having established what he wanted to know, that is, that 'such and such a place is occupied'." (MTO)

339. Fire Plan. "When we fired our 81-mm mortars or 75-mm assault guns at night, we sought to prevent disclosure of our gun and mortar positions by firing at the same time as our supporting artillery. We obtained schedule of fires from the supporting artillery and arranged our fires accordingly. The lack of counterbattery fire on our positions indicated that our plan was successful." (ETO)

340. Flares. "When we use an incendiary grenade as a substitute for a mortar flare, we place it eight inches above the ground and build a dirt shield around it to prevent illuminating friendly troops. The flares are placed in front of or to the side of our positions, so that the enemy fire they draw will not fall on our troops." (ETO)

341. Flares. "We used thermite grenades as a substitute for flares by attaching them to the rifle grenade adapter and firing them with the M7 grenade auxiliary booster charge. They give good visibility for one minute, and can be used at ranges up to 150 yards." (ETO)

342. Freezing of Weapons. "We found that some failures of our light automatic weapons to fire the first two or three rounds, especially on

patrol missions, were due to the weapons having been carried into warm rooms during a briefing. Moisture condensed on the weapon, and the ice formed when it was again exposed to the cold interfered with the initial operation of the piece." (ETO)

343. "Friendly Civilians were generally unable to give precise locations on a map, but were frequently able to pinpoint locations on a photograph." (ETO)

344. Grenade. "A small piece of primacord was taped to the bottom of the thermite grenade. When the grenade had burned low, the heat detonated the cap, spattering the molten metal in all directions." (SWPA)

345. Grenade Carrier. "Antitank grenades may be carried in empty bandoleers by cutting holes in the bottom of the packets and pushing the heads of the grenades through them." (ETO)

346. Grenades. "The fragmentation grenade in the adapter may be used for air bursts by inclining the rifle at the proper angle, which may be determined by test at the various ranges." (ETO)

347. Infantry Motto: "What we go for we get. When we get we hold." (ETO)

348. Infiltration. "We require units to search their areas, especially buildings, every morning for enemy that may have infiltrated during the night. We almost always find some. Sometimes they do not know where they are. Once several Germans started digging a machine-gun position 200 yards behind our front lines." (ETO)

349. LMG on Packboard. "We facilitate transporting the LMG and putting it in action by fastening it securely to a standard packboard. It is carried barrel up, and can be put in action quickly, using the packboard as a firing platform. In emergency, it can be fired from the back of a man transporting it by merely having him fall face down. The gun is carried loaded, with the ammunition belt lashed down by a strap which can be loosened quickly." (ETO)

350. Machine-gun Flash. "To make it difficult for the enemy to pick up the location of a machine gun that is about to open fire, we have several riflemen open with rapid fire simultaneously from the same vicinity." (ETO)

351. Mines. "Enemy mines which have been lifted should be placed in small groups but not stacked. Casualties have been caused by stacking mines until the heavy pressure detonated those at the bottom." (ETO)

352. Mines. "Infantry should be more observant for mines and notify tanks as to their locations. On one occasion I saw a tank run over and set off 13 mines that were in plain view of the advancing infantry who could have spotted them for the tank commanders and prevented this occurrence." (ETO)

353. Mines and Booby Traps. "Get some paper clips, pieces of wire, or pins, and carry them with you all the time. Every mine or booby trap that I had anything to do with could be neutralized with a paper clip, a piece of wire, or a pin." (MTO)

354. Mines and Booby Traps. "Personnel pulling mines and booby traps from a distance should face the explosion so that they can see and dodge the flying debris." (ETO)

355. Mines and Booby Traps. "We have used the rods from 155-mm cloverleaf ammunition containers to aid in locating mines. We put a point on each rod and bend one end to form a handle. We issued about 250 to each infantry regiment. The cane can be used to discover trip wires by swinging it gently ahead; to feel in advance, when crawling, for trip wires and prongs of mines and to probe for buried mines. Probing should be done at an angle, so as not to detonate mines which require only light pressure. Troops can be convinced of the value of this expedient by training them in our own mine fields. Replacements, particularly, should be given some of this training." (ETO)

356. Mines and Booby Traps. "To clear antipersonnel mine fields which are connected with trip wires, a dummy grenade with 60 yards of assault wire securely attached provides a good aid. It is thrown out, then dragged back through the mined area, thus detonating the mines." (NATO)

357. Mine Sweeping. "Engineer companies of tank and TD supporting infantry divisions must realize the necessity for sweeping a wide path for movement of TD's and tanks. Tanks and TD's cannot move over a mined road which has been swept only wide enough to accomodate light wheeled vehicles." (ETO)

358. Mortar Flash. "When the enemy was trying to range on the muzzle flash of our mortar, we would fire another round just as his shells hit.

This seemed to confuse him; he could not tell which flash was from our mortar." (ETO)

359. Mortar Tubes, Painting. "Shiny mortar tubes may be painted with heat-resistant engine paint, followed by a coat of OD enamel." (ETO)

360. Movement. "Don't move around too much at the front. We did so much of this that the German prisoners told us they thought it was a ruse. They didn't think we could be so dumb." (MTO)

361. Muzzle Cover. "The K-ration cellophane bag will fit the muzzle of the 57-mm gun and keep the bore clean. It does not have to be removed when the gun is fired." (ETO)

362. Night Artillery Adjustment. "60-mm mortar illuminating shells were used to permit adjustment of artillery on an enemy tank that had been firing into our area at night. The mortar shell was known to illuminate 11 seconds after leaving the muzzle, and to burn for 15 seconds. The artillery reported that the time of flight of the artillery shell to the target was 17 seconds. The heavy weapons company commander arranged to fire the two at exactly the same time, thus giving the observer 9 seconds of light after the strike of the artillery. This enabled him to call corrections back to the battery. The procedure was continued until accurate fire was placed on the tank." (ETO)

363. Night Firing. "A small flashlight bulb taped to the front of the M4 mortar sight so that it will shine through the collimator makes sighting on aiming stakes considerably easier when firing at night." (ETO)

364. Night Operations. "Men are more frequently hit while standing up at night than during the day. This is because they know they cannot be seen. In reality, they are just as liable to be hit by random missiles as they are during the day." (CBI)

365. Observers. "Our OP's use a 10-inch azimuth disk which enables observers to catch fleeting targets which would be lost while waiting for the compass needle to come to rest. The board is made by mounting a 10-inch azimuth dial card, reproduced by the corps topographical company and graduated in degrees and mils, on a piece of plywood or masonite. Masonite is preferred for wet weather use. A pivoted sighting bar is mounted on the board so that it can be sighted on an object and the reading taken directly from the card. The board is oriented by compass when first put into position." (ETO)

366. Officers' Training. "All infantry officers must be able to command a unit; too much specialization in staff duties is impracticable." (MTO)

367. Prisoners. "While in the beginning most of our interrogators worked with maps, we now use air photos whenever feasible. It is easier to orient a PW on a photo, especially if it is an oblique." (MTO)

368. Prisoners. "It has been found that PW's will not point out their CP s on an American map, due to their inability to read these maps, but generally will readily locate troop locations, etc., on their own maps." (ETO)

369. Prisoners. "A good way to make Japanese prisoners talk was to threaten to send their names home to Japan. Since this would disgrace their families, prisoners would always talk freely to prevent its being done." (SWPA)

370. Rifle. "Pay particular attention to the trigger housing group on your M1 rifle. A few grains of sand between the hammer and housing will cause a misfire." (ETO)

371. Souvenirs. "Trained intelligence personnel should be among the first to enter a captured fortified position, command post, or other installation which might contain documents or equipment of military intelligence value. An examination by such personnel can be made immediately to determine the intelligence value of the material and to prevent the removal of valuable material by souvenir hunters." (ETO)

372. Submachine Gun. "We find that by turning the Thompson submachine gun on its side when firing it is possible to prevent a rising fire." (ETO)

373. "Wounded Men have valuable information. I intend to place an intelligence and reconnaissance platoon man at the clearing station to talk to the less seriously wounded men." (ETO)

Chapter 7

FIELD ARTILLERY

ATTACK

374. "Coordination of Artillery Fire with advancing infantry may be obtained by the following methods:

a. Artillery forward observer informs infantry company commander when last volley is on the way and the latter informs the platoon leader by radio. This is dependent on all radios being in good working order.

b. Firing the last one or two volleys as high bursts (time fire). This is dependent upon time fire not being part of the concentration itself, upon infantry observation not being obscured, and upon the absence of trees to cause air bursts.

c. Lifting fire on a closely coordinated time schedule. Normally, this is practicable only for preparatory fires up to about H plus 10 or H plus 15.

d. Designation by artillery forward observer of infantry front line locations during the advance, using 1:10,000 maps with hedgerow fields or terrain features numbered. This is dependent on having accurate maps available and the time in which to number them." (ETO)

375. Tanks. "An artillery forward observer should accompany each supporting element of tanks and not depend entirely upon armored forward observers." (ETO)

376. Time Fire. "When supporting tanks and infantry, use time fire (on the objective) preceding the infantry assault. Under cover of this fire, the tanks may attack unhindered by the enemy's bazookas and antitank weapons." (ETO)

AMPHIBIOUS OPERATIONS

377. Amphibious Tractors. "After landing, it may be necessary to move artillery across swampy terrain. Therefore, it is desirable that amphibious tractors be available for emergency use in moving the artillery and other heavy equipment." (SWPA)

378. "Delay Fuze should be used against prepared positions 50 percent of the time. The delayed action permits penetration of dugouts and brings the enemy into the open." (ETO)

379. Direct Hits. "Observers must be able to get direct hits to knock out prepared defenses. One piece, precision adjusted on a defense emplacement, can be effective where area fires of a battalion may fail." (ETO)

380. "Pillboxes can best be reduced by mixing light and heavy fires. The light battalion adjusts on the pillbox, passes the data on to the heavy battalion, then stands by for a time-on-target shoot. The heavy guns then fire a few rounds for adjustment, using quick fuzes, then change to concrete-piercing fuzes, which will cause the enemy to leave the pillbox. The 105-mm TOT shoot will catch them in the open." (ETO)

381. Precision Adjustment. "Young officers should be taught to fire precision adjustments. Forward observation methods are not as effective as precision methods in firing at concrete gun emplacements." (ETO)

382. "Range determines whether a point target can be destroyed and not whether the method of fire is direct or indirect. At short ranges it is safer to use indirect fire by the expenditure of two or three rounds for adjustment than to employ direct fire from an exposed position." (ETO)

MISCELLANEOUS

383. Aiming Stakes. "Aiming stake lights controlled by a switch at each piece have proved valuable in avoiding the necessity for searching for stakes in the dark, in saving on flashlight batteries, and in cutting down the risk of discovery by the enemy." (ETO)

384. Counterbattery. "When receiving reports of flat trajectory weapons being fired from any given direction, make a contour study of the map and select possible locations for the enemy guns. Artillery fire placed on these locations usually brings good results." (ETO)

385. Forward Observers. "Three FO's should be kept with each infantry battalion at all times to insure that observers will be available for reserve companies that are hurriedly committed. Observers should remain forward during the night in order to repel night attacks." (ETO)

386. Forward Observers. "All enlisted men who accompany the forward observer should know how to conduct fire, in order to replace the officer if and when he becomes a casualty." (ETO)

387. "High-Angle Fire on targets on a crest or a reverse slope in very rough terrain gives a much smaller probable error on the ground. Dropping a round through the roof of a building is often easier and more effective than knocking a hole in the wall." (MTO)

388. Infantry Training. "Gun positions have been assaulted repeatedly; therefore, it is necessary that artillerymen should be trained in scouting and patrolling tactics for small units, offensive and defensive tactics for small units, and terrain appreciation. They must be trained in the use of machine guns, mortars, grenades, and land mines." (ETO)

389. Mountain Warfare. "In mountain terrain, minimum elevation very often must be calculated for masks that cannot be seen from the gun position. The minimum elevation for the second or third hill from the gun may be more than the minimum elevation for the hill mask, which is the highest mask that can be seen from the gun." (MTO)

390. Night Firing. "Painting the breech ring and the breech lever of the 155-mm howitzer with phosphorescent paint greatly simplifies the problem of loading at night." (ETO)

391. "Observation Posts must not be the meeting place for visitors. Well-meaning people crowding near a BC telescope and otherwise neglecting camouflage discipline invite enemy fire." (MTO)

392. Pack Howitzer, 75-mm. "High-angle firing can be accomplished by construction of a platform of sandbags and wood above ground level and digging a trail pit below ground level large enough to shift at least 150 mils right or left. The piece can be fired with a quadrant elevation of 1300 without bouncing any more than in normal firing. Take the difference between the elevation for the range of the target (low-angle fire) and 780, add the difference to 780, and an elevation can be obtained that will give a satisfactory initial round for observed fire. Site should not be considered for this type of firing." (MTO-CBI)

393. "Reconnaissance by Artillery Fire has proved of considerable value. This technique is the exact opposite of the 'sleeper' counter-battery policy. It can be used when an observer is in doubt as to whether or not he sees enemy installations in a certain area. In such a

Figure 16. Visitors.

case he may call for a 'flush mission.' This consists of a round or two fired into the suspected area. If activity develops, neutralization or destructive fire is employed." (ETO)

394. Sound Adjustment. "When observation is difficult or impossible in wooded terrain, artillery fire may be adjusted by sound. Observers can be trained in this method by firing at night or at defiladed targets." (ETO)

Chapter 8

TANKS AND TANK DESTROYERS

ATTACK

395. Advance. "When advancing, shoot up the countryside to rout the enemy from houses and groves." (ETO)

396. Air. "The tank-dive bomber combination simply cannot be beaten. The knowledge that planes are with them greatly increases the confidence of the tankers. They know they cannot be hit without warning and are willing to move ahead boldly. The planes not only are useful to give this warning, but are of considerable help in meeting the threats. When necessary they can quickly get other planes to assist. This team should become standard." (ETO)

397. Ammunition. "When an enemy tank is hit with AP ammunition, follow with a round of HE to set the tank on fire." (ETO)

398. Ammunition. "Blitz action by tanks has proved generally unsuccessful. If tanks advance too fast they have to return to mop up and relieve the pressure on infantry pinned down by pockets of resistance overlooked in the hasty advance." (ETO)

399. Command. "The TD battalion, in offensive warfare, should operate under the G–3 of the division and not under the artillery commander." (ETO)

400. Control. "To retain some measure of control and to employ to full advantage of fire and movement, platoons should be kept intact. A section should never be split up except for purely defensive missions such as roadblocks. Resupply of fuel and ammunition when tanks are scattered is all but impossible, and command supervision of their action is negligible." (ETO)

401. "While there are occasions when tank company and battalion commanders should actually participate in the battle, they are few. Their principal job, once the organization is committed, is control and co-

ordination of action between elements of their commands and the supporting arms. An attempt at battlefield control near the point of contact usually results in invasion of a subordinate's authority, and more confusion than assistance usually ensues." (MTO)

402. Employment. "Tanks must be used only over terrain suitable for tank movement and against definitely located enemy resistance which has been holding up an advance, not against areas of unknown resistance." (SWPA)

403. Engineer-Infantry-Tank Teams. "It was necessary to advance along roads in narrow valleys with heavily wooded high hills on either side. It was impossible for tanks to advance along any of these roads until mines were removed by engineers. The usual procedure was for the infantry to attack through the woods on both sides of the road. After the infantry 'pinched off' a section of the road, engineer troops (usually a platoon) cleared that section of the road of mines; then the tank platoon moved forward and assisted in the establishment of a road block." (ETO)

404. Floods. "When our battalion tried to attack across a river, the enemy quickly flooded low fields on either side of the river with a hastily made dam of rock, earth, and rubbish. We lost ten tanks, bogged down." (MTO)

405. Grenades. "In the absence of infantry, tanks have made effective use of hand grenades to clear the enemy from entrenchments and places of concealment. On enemy defensive positions, the tanks run along the entrenchments and drop in the grenades. Along roads, the grenades are tossed into fox holes or suspected positions discouraging the enemy use of bazooka and AT grenades. Each tank carries ten or more grenades for this purpose. We have also found flamethrowers on tanks effective against enemy bazookas and personnel placed alongside the road." (ETO)

406. Gunnery. "In training tank crews, too much practice in acquiring speed in gun manipulation cannot be given. We make it SOP to fire into all tall buildings, as they invariably contain snipers and machine gunners. We continue to fire at an enemy tank until it catches fire, to prevent its repair or use as a pillbox." (ETO)

407. Liaison. "It is practicable to have the executive officer of each tank destroyer gun company remain at the CP of the regiment which the company is supporting, acting as liaison, with a 608 radio. In this

way, the company commander is able to stay abreast of the changing situation and to remain forward with his platoons." (ETO)

408. Marching Fire. "Regardless of the number of tanks making the advance, marching fire is begun as soon as enemy held ground is within range, and continued until objectives have been taken or defiladed positions reached. We feel that the wisdom of this policy has been conclusively proved by the number of weapons found abandoned, and by statements of German prisoners that this type of firing drove their men away from their weapons." (MTO)

409. Mine Fields. "Tanks crossing newly bombed areas suspected of containing mines will find the safest going near, in, or through bomb craters." (ETO)

410. Mountains. "TD's operating in hilly or mountainous country should clear the main road. The accompanying infantry may attack along ridge lines parallel to the road and neglect any enemy resistance on the road itself." (MTO)

411. Night Attack. "The value of a tank in a night attack is doubtful. The noise and movement of the tanks bring down artillery fire, cutting down the efficiency of the infantry. However, tanks can be used as support-by-fire in a night attack, provided that communication with the infantry is maintained." (MTO)

412. Night Driving. "During night operation, it is safer to avoid shifting gears. Travel must be performed at a slow and even speed. Disengaging clutch in order to shift gears, may cause an exhaust flash which is often spotted by enemy observers and soon brings down artillery fire." (MTO)

413. Observation. "When observing from the ground, destroyer commanders should keep at least 30 yards from the destroyer to avoid ricochets." (ETO)

414. Operations. "In the past period of combat, the successful engagements carried out in the most economical manner in both casualties to infantry and light tanks were those planned as follows: medium tanks led the attack on enemy positions; infantry followed at distances from 100 to 200 yards behind the medium tanks. (At times, the medium tanks were at distances considerably greater from the infantry.) Light tanks stayed right with the infantry where they were able to knock out those positions which the medium tanks bypassed. The infantry used green

smoke grenades to call the attention of light tanks to the fact that they had targets which they wanted to point out to the tanks. The light tanks, moving with the foot troops, caused the enemy to give up readily." (MTO)

415. Pursuit. "The spearhead of a pursuit should consist of a small, compact, highly mobile task force made up of the combined arms (cavalry, tanks, tank destroyer, infantry, engineers) supported by artillery. Two such forces should advance on each axial road. When the leading force has been deployed by enemy action, the rear force should be prepared to pass rapidly through or around the leading force as soon as the situation permits, so as to relentlessly maintain the continuity of the pursuit. Speed is essential. All or part of the infantry should be mounted on the tanks rather than on their own carriers so that they may be made more compact by elimination of the infantry carriers. When contact with an enemy road block has been made, one or more platoons of tanks, with the infantry, should immediately be ordered to make a close-in envelopment of the enemy after a hasty reconnaissance. This will usually force the enemy to abandon his position or will at least develop the situation. If carried out with sufficient speed, it will succeed in cutting off the enemy rear elements. Time should not be wasted in making elaborate plans at this stage." (MTO)

416. Reconnaissance. "Reconnaissance is a never-ending function of tank destroyer units. Reconnaissance for ready, fire, alternate, supplementary, and rally positions must be made before an action. Tank

Figure 17. Pursuit.

destroyer units should not be given missions properly belonging to the reconnaissance troops of divisions and corps. Their reconnaissance should be limited to their own operations. Experience in Africa has shown that the TD reconnaissance company is very apt to be sent off on corps or division reconnaissance missions. Though this is wrong, it will undoubtedly continue to happen. Therefore, the security sections are likely to become the sole means of close reconnaissance and should be thoroughly trained for such employment. Also, every man should be capable of acting as a forward observer for artillery fires." (NATO)

417. Rehearsals. "Where time has permitted a rehearsal of a proposed operation, very beneficial results have been obtained. In combined tank-infantry operations, each one obtains a clear picture of what it will do; communication and control problems and rough spots are ironed out. Best results are obtained when the maneuver can take place on terrain similar to that over which the operation will take place." (MTO)

418. Ricochet. "When the target is enemy infantry, use HE, fuze delay, and aim slightly short. Often the effect will be a low air burst over the enemy position." (ETO)

419. Riders. "We rode eight men on a medium tank and six on a light tank, all on the rear deck. We first sent out a wave of tanks buttoned up, put time fire from the artillery on them, and followed with the tanks carrying the men. The artillery observer rode with the leading wave and controlled the fire, setting his fuzes a little high. To insure control by the infantry CO and the tank CO, I put them both in the same tank. The infantry CO hung his SCR–300 on the outside of the tank and worked directly with that part of his battalion which followed. Infantry company commanders could talk to tank platoon commanders by telephones hung on the back of the tanks. We fought this way for eight days and nights, and the foot soldiers loved the scheme. A disadvantage: It fails to use most of the crew-served weapons. We are going to try to utilize the heavy weapons company by riding it on tanks." (ETO)

420. Roads. "Tanks must stay off roads and use available cover or they will eventually be knocked out. Enemy AT guns invariably cover roads and a vast percentage of tank losses have been incurred on the road. Tanks on the road, in column, are useless. It is only from a deployed formation that they can make maximum use of their fire power." (ETO)

421. Smoke. "The use of smoke shells is effective to mark a target for an air strike." (ETO)

"The mortar platoon of the tank battalion should go in position so it can smoke observation posts or antitank positions on call of the tank commander of the assault wave." (ETO)

422. Support. "In an attack, a TD platoon supporting an infantry battalion should move forward with the reserve company by bounds. The platoon leader accompanies leading infantry company commanders and directs movement of his platoon forward and the fire of the platoon on targets of opportunity by radio or hand signals. In so doing, the platoon leader can keep abreast of the infantry situation and can note routes and gun positions prior to ordering his platoon forward." (ETO)

423. Tactical Unit. "The platoon of five tanks is capable of mutual support as a tactical unit. Tanks in the first wave must always be supported by other tanks. A wedge column or V-formation is mandatory in close country. Supporting distance is visual contact distance. Leading and supporting tanks must not both be in motion at the same time." (ETO)

424. Target Designation. "Tanks are almost blind in thick country. Obstacles to be avoided and targets to be fired on must be designated to the tank commander by the infantry squad leader. Since enemy pillboxes are extremely well hidden, prime consideration must be given to target designation. Tracer fire proved unsatisfactory. The only method which succeeded was the use of grenades giving red or violet smoke. The full charge grenade produces too much smoke and obscures the target; however, if the fuze is unscrewed from the grenade and half the charge removed, an adequate amount of smoke will be produced. Rifle projection of the grenade is desirable for longer ranges." (SWPA)

425. Targets. "When observing, all tank personnel should keep their eyes and guns on the suspected targets and not on advancing elements." (MTO)

426. Terrain. "When tanks are canalized by difficult terrain or are held up by mine fields, it is necessary for the infantry to precede the tanks. The tanks, however, must continue to give the infantry fire support, backing up to high ground, if necessary, to keep the infantry in view." (MTO)

DEFENSE

427. Antitank. "Tanks should be made proof against magnetic mines. Wood or steel covering must be provided for idlers and bogies. Japs

etrack a tank by inserting a bar or rifle. Heavy limbs and logs do the ame. All outside protuberances likely to catch in heavy foliage should e cut off. Outside handles should be cut down or be removable so that aps cannot pry doors open from the outside." (SWPA)

28. Dismounted. "When MG's are dismounted for security work, dig hem in. The tendency is to throw the gun on the ground and forget bout it." (ETO)

29. Indirect Fire. ". . . In a defensive situation, tank units can assist he infantry and artillery by firing indirect fire missions from their ositions in mobile reserve. It was found that using tank fire on ıedium range harassing missions freed the artillery to give more lose-in fire support to the infantry." (MTO)

30. Road Block. "Weapons covering a road block should be off to the anks. It is desirable to have 360° field of fire because enemy vehicles ıay try to get out of the area as well as crash into it." (ETO)

31. Security. "Infantry security should be provided or the TD's hould pull back and consolidate with the tanks at night for protection gainst enemy infantry." (ETO)

RIVER CROSSING

32. Bridges. "Tanks should approach a Bailey bridge straight and not low down on either bridge or ramp. Select the proper gear to prevent talling; any turning must be done before mounting bridges." (ETO)

33. Control. "In a drive across a river, it is advisable to have platoons ttached to the battalions, rather than to have the company under the ontrol of the infantry regiment." (ETO)

34. Engineers. "A separate tank battalion is almost entirely dependent pon supporting engineers in crossing streams. On account of muddy errain, our armored bulldozers proved of little use. The terrain was so ıuddy that even minor streams became major obstacles requiring con-truction of approach on both sides of the stream; consequently, any tream crossing became an engineering problem." (ETO)

35. Ferrying Medium Tanks. "A ferry for a combat-loaded and sand-agged M4 tank should include five M2 treadway floats instead of four s specified." (ETO)

Figure 18. Crossing under difficulties.

436. Selection of Crossings. "Stream crossings should, when practicable, be constructed at points not shown on the map as crossings, and not formerly used by the enemy. Crossings recently encountered have been heavily mined or prepared for demolitions." (ETO)

AMPHIBIOUS OPERATIONS

437. Employment. ". . . The landing of tanks as the initial assault wave against a well defended beach with obstacles to cut through is not believed to be sound procedure. It is believed that the initial assault should be infantry. This operation pretty well proved that demolition units under heavy fire cannot cut paths through obstacles. LCT's get caught easily. They and the tanks are sitting ducks; and, in addition to the initial obstacles, we find our LCT's and tanks clutter the beach to form an extra hazard to the small boats bringing in the assault wave. Naval gunfire, rocket fire, and air bombardment will never completely silence a well-fortified beach. Troops on the beach are going to have to take care of what remains. The beachhead must be established and I do not believe it can be done efficiently unless troops are put on the beach first." (ETO)

438. Employment. "I am convinced that tanks, either lights or mediums, should be in the first, second, or third wave. In the first place, they can be used as artillery until the latter has landed. Secondly, they are effective against enemy personnel and armor, and lastly, their presence has a very stimulating morale effect upon the infantry troops." (MTO)

439. Waterproofing. "Disassemble brake drums and paint all surfaces." (ETO-SWPA)

COMBAT IN TOWNS

440. Buildings. "Keep clear of two-story buildings. Grenades can be thrown into turrets." (MTO-ETO)

441. Bypassing. "In passing villages, tanks should move around them at a range in excess of the effective range of the antitank guns which are apt to be concealed in the villages. I have seldom seen a tank struck on the front by an antitank gun because our enemies generally put their antitank guns on reverse slopes or in places where they can get flanking fire." (ETO)

442. Infantry Support. ". . . It is disastrous for tanks to go unattended by infantry into small towns with narrow, winding streets where

they are easily boxed in and knocked out. If possible, tanks should not use the main routes into towns but should work in over secondary streets. Infantry should be right with the tanks which can fire over the heads of the infantry when machine guns and small arms open up on them . . ." (MTO)

443. Occupation. "Armored forces should not be given the mission of taking and holding towns." (ETO)

444. Outposts. "Tanks should never be left in towns at night. A town is a choice artillery target and the presence of tanks will almost insure an artillery concentration. Maneuverability is lost when the tank is used on outposts. Darkness prevents exploiting the tanks' capabilities and the protection needed by tanks against attack by infiltrating enemy patrols at night is out of proportion when they are left in a town." (ETO)

445. Reconnaissance. "TD's should never enter towns and villages without prior foot reconnaissance, and then only by a route other than the main road. If the town is known to be occupied by the enemy, TD's should remain outside and fire into the town, supporting the attacking infantry." (ETO)

446. Ruse. "We developed and used a different technique of village fighting. The leading infantry-tank team would make a feint of by-passing the village and, proceeding through alleyways or yards, would attempt to arrive at some central part of the village. When it reached this portion of the village, each tank or section, depending upon the road net, would disperse in a different direction, coming upon the enemy antitank positions from the rear. This seemed to have additional psychological effect upon German troops . . . causing them to believe they were not only surrounded, but cut off into small groups. On two occasions, German garrisons surrendered without using their weapons and antitank defenses. Speed and surprise is the essence of this maneuver." (ETO)

447. Villages. "The use of tanks in village fighting is very unprofitable and expensive in material, and should be avoided whenever possible. Lack of maneuver space and available hull-down positions making impossible the maximum use of tank fire power without exposing the entire tank silhouette, enemy antitank guns, and close-in antitank weapons have a tremendous advantage." (ETO)

448. White Phosphorus. "We have had excellent results with WP fired from the 75-mm tank gun. It is very effective in the attack of villages, as it sets fire to houses and drives the enemy out more quickly than HE. Its use against enemy armor is giving excellent results, blinding the hostile tank crew and allowing our tanks to maneuver." (ETO)

ATTACK OF FORTIFIED POSITIONS

449. Aiming Point. "The best place to hit on a blank wall of a pillbox is a point 10 feet from the edge and 10 feet from the top horizontal line. This will allow approximately 6 to 8 feet for the side walls and the roof and will avoid inside partitions." (ETO)

450. Assault Artillery. "When used as assault artillery, TD's must be furnished close infantry protection." (ETO)

451. Breeching of Siegfried Line. "Tactics and technique identical to that of a stream crossing were used." (ETO)

452. Bridgehead. "Combat Command B established the usual bridgehead by cleaning out the AT guns and automatic weapons that covered the dragon's teeth by fire, and with tank dozers pushed earth to establish a ramp over the dragon's teeth. The tank dozer method worked perfectly." (ETO)

453. Location. "TD's should remain in rear of the assault battalion areas. When a suitable target is found, the platoon leader or gun commander should go forward and reconnoiter gun positions and routes thereto, before bringing the destroyers forward. When the target is reduced, the TD's should withdraw to a position in rear of the infantry until a new target is found. Under no circumstances should the guns advance until the infantry has gone forward and located targets." (ETO)

454. Organization. "In situations requiring the attack of pillboxes, or in very close country, the tank section is the normal tactical unit." (ETO)

455. Pillboxes. "We used the standard infantry-tank team—a platoon of tanks in support of a company. It is best to advance on a wide front to avoid excessive losses from flanking fire. Tanks operated as bases of fire against bunkers, allowing the infantry to close in. Infantry protected tanks from bazooka teams. We have not employed the cannon or AT companies well forward due to lack of protection and the little effect

their fire had against concrete bunkers. Direct attack with tanks and TD guns has been most effective. Smoke from artillery and mortars was used to prevent flanking fires. We used a tank dozer protected by a tank and infantry platoon to cover the doors and embrasures with earth." (ETO)

456. Plan. "A good plan of attack is to close the embrasures by AP and then to lob several HE shells around the pillbox to take out any machine guns, antitank guns, and infantry who might be outside, before our infantry or engineers advance to place demolition charges." (ETO)

MISCELLANEOUS

457. Ammunition, Additional. "The medium tank normal ammunition load has been found insufficient when working with infantry. Steel studs welded between the sponson racks and on the floor of the turret basket keep extra ammunition from slipping and 50 percent more rounds can be carried." (ETO)

458. Ammunition Storage. "Vertical studs welded on sponsons of M10's, and the cutting out of partitions in the floor compartments provide additional storage space for ammunition." (ETO)

459. Antidim. "We put regular gas mask antidim on the sighting instruments in our tanks to prevent their fogging up when we went into action buttoned up. The antidim clears the vision completely. It lasts between six and eight hours." (ETO)

460. Armor. "Half-track armor welded to the floors of jeeps, armored cars, and light tanks gives good protection from mines." (ETO)

461. Armor. "Sandbags are a good substitute for additional or spaced armor." (ETO)

462. Assembly Area. "In an assembly area, only one tank should be used for radio and that tank should be sited 600 yards or more from the area. Extended transmissions of radio enable the enemy to locate the position of the transmitter." (NATO)

463. Camouflage. "As an aid in affixing natural camouflage, wind chicken wire around the gun barrel and stretch it over the hull of the vehicle." (ETO)

464. Cooperation. "Working with the same infantry and artillery units throughout an operation makes possible a much more efficient team." (ETO)

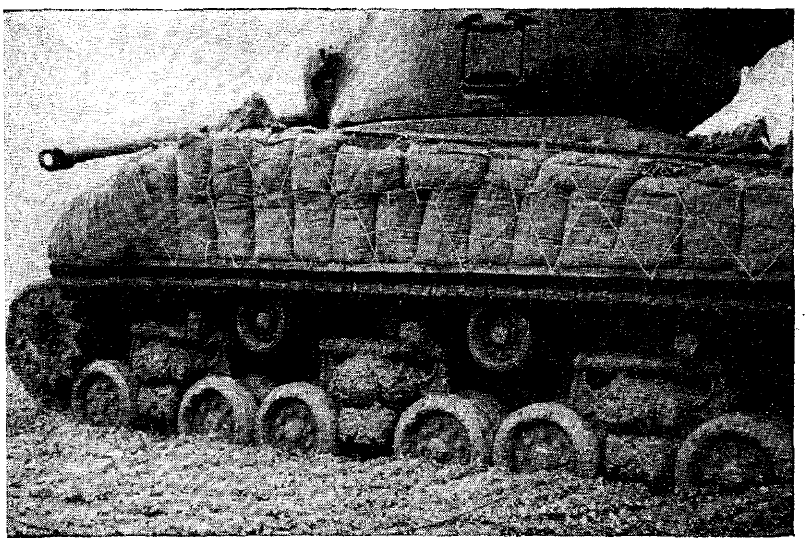

Figure 19. Sandbags for armor.

65. Decentralized Control. "The TD company and platoon must be rained to function as independent units of the battalion in supporting nfantry or tank action. The company frequently is detached for rtillery support and must be able to function independently in that ole." (ETO)

66. Disabled Tanks. "Crews should stay with immobilized tanks, nanning their guns as long as possible. However, if the situation hanges, the crews must be notified and they must be resupplied with mmunition. When contact is impossible, chances of retrieving the ank are gone; the crews should destroy their tanks and infiltrate back o our lines." (ETO)

67. Employment of TD's. "Not at any time should TD's be split into roups smaller than a section. Single destroyers in support of infantry vill be destroyed or driven back. Terrain governs the assignment of TD's. One regiment had a company and half in its area while another egiment had one platoon." (ETO)

68. Equipment. "You can move in a hurry if you keep your equipnent mounted on the destroyer." (ETO)

69. Equipment. "Clover leaf rods welded on two rear sections of TD ounterweights provide racks to carry field bags." (ETO)

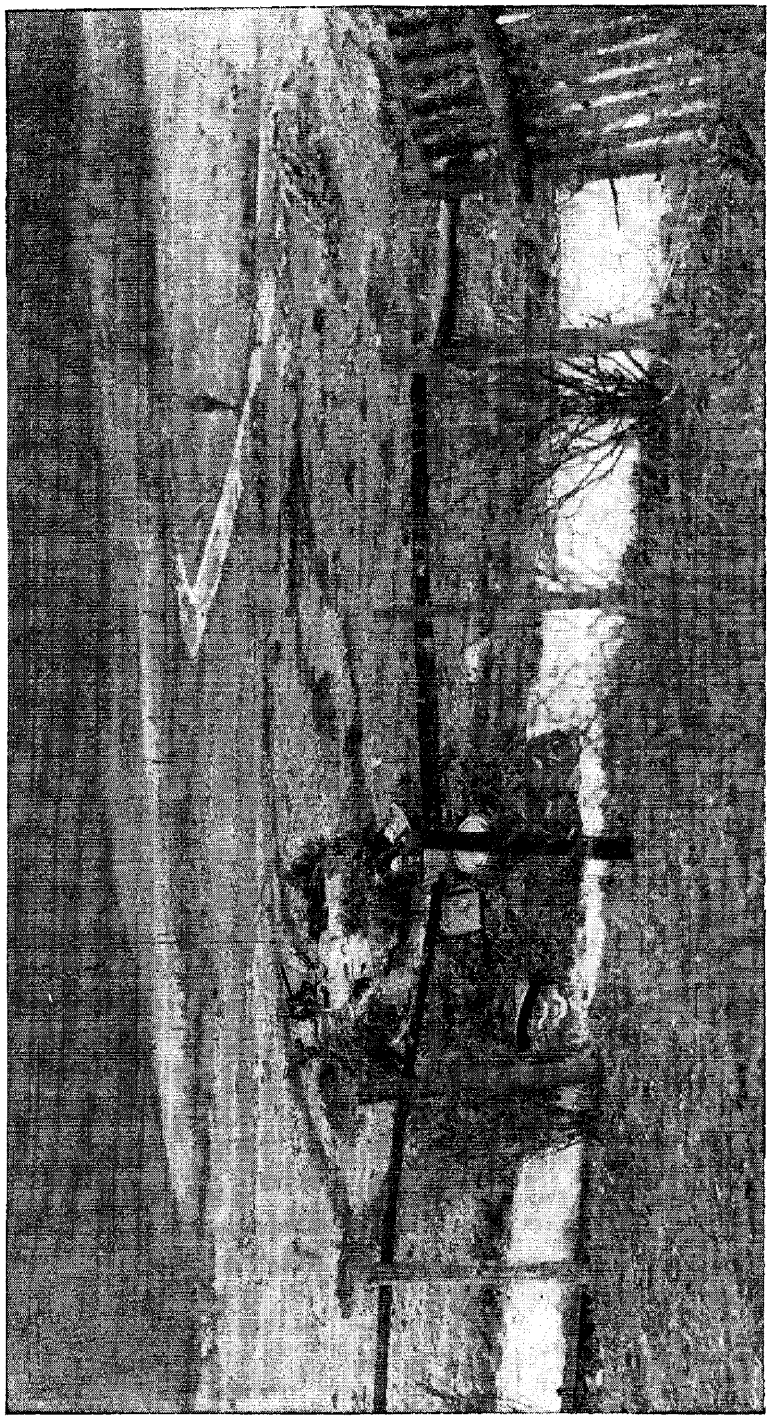

Figure 20. Camouflaged.

470. Gun Tubes. "The extended use of tanks for indirect fire results in wear to the gun tube and decreases the accuracy of the gun when it is used for direct fire." (MTO)

471. Illuminating Shell. "It is easy to adjust fire on any target disclosed by the 3" star shell, Navy, fuze M54. Best results can be obtained by firing a series of four rounds at 10-second intervals with a 50-mil shift in deflection for each round. Using a burst height of 1,100 feet, an area about 400 yards square is effectively lighted by each round. The combination tool for caliber .50 machine gun may be used for setting the fuze on shell, illuminating, M24, Mod. 1, Navy." (ETO)

472. Indirect Fire. "Jeep hood latches can be used to hold the turret-traversing handwheel from drifting off in firing indirect fire with the M10." (ETO)

473. Indirect Fire. "In indirect fire precision adjustment with the 90-mm gun, the large probable error makes the use of 'C' in adjusting unsatisfactory; the use of the fork gives satisfactory adjustments." (ETO)

474. Indirect Fire. "When firing artillery missions with the M10, greater accuracy is achieved by placing the aiming stakes to the right rear of the direction of fire. In this position, the displacement error caused by the rotation of the sight on the turret is negligible." (MTO)

475. Indirect Fire. "When TD's are used as artillery, the division of a company into two six-gun batteries is more advantageous from a control and massing of fire standpoint." (MTO)

476. "Infantry should be 'married' to the tanks to an extent that one tank company and one infantry company are blended as a unit using one consolidated mess and bivouacing together. The infantry platoons sleep and work with the tank platoons." (ETO)

477. Jungle. "Medium and light tanks should be accompanied by a bulldozer and heavy tractor or have wider tracks with grousers, similar to those on buffaloes." (SWPA)

478. Machine-Gun Mount. "One TD unit has modified its .50 caliber machine-gun mount by placing it low on the right front of the turret, lowering the handles, ammunition box, and trigger, and aiming with a standard prism. This makes it possible to defend the destroyer against

infantry fire and bazookas, which have been used very effectively by the enemy in close terrain." (ETO)

479. Mine Field Clearing. "Experience has proved the necessity for training all combat personnel of tank units in the technique of clearing paths through hasty mine fields." (MTO)

480. Muzzle Covers. "Greased cloth is usable as muzzle and breech covers and can be shot off the muzzle when the gun goes into action." (ETO)

481. Occupation of Position. "Move into positions slowly; fast-moving objects attract attention. After a 5-minute warm-up, M10's may be moved for short distances in second gear at 800 rpm. This will produce as near silent movement as possible. However, this should be done only for secrecy as the running of long distances in this manner will harm motor." (MTO)

482. Radiators. "Radiators on the M10 can be protected by removable armor slides or hinged armor." (ETO)

483. Recovery. "Provide adequate security so that recovery crews can work undisturbed. Use smoke to screen their activities. Prepare the disabled vehicle for recovery by filling in craters, clearing mine, and digging out buried parts of the vehicle. Use double blocks and anchor the recovery vehicles firmly." (MTO–ETO)

484. Safety First. "Stay inside the destroyer during artillery and mortar fire. If time permits, the track and front of the destroyer should be sandbagged before the artillery attack begins. A long slit trench under the hull makes excellent protection for the crew when sleeping." (ETO)

485. Sandbags on Tanks. "Opinions as to the effectiveness of sandbags on tanks are divided. Some feel that it assists the projectile in penetrating by preventing ricochet, whereas others have considerable confidence in its protection." (MTO)

486. "Self-Propelled Tank Destroyers have proved to be far superior and more adaptable to antitank defense in close support of the infantry than the towed tank destroyer gun for the following reasons: sufficient armor to permit movement under small-arms fire; 360° traverse; greater battlefield maneuverability; the gun crew is one-half the size of that of the towed tank destroyer gun crew; the M10 TD carries a larger basic

load; the self-propelled tank destroyer is ready for action at all times, when displacing forward to meet the attack." (ETO)

487. Sights. "Placing cotton against the sight lens, underneath the sight cover, will prevent the lens from frosting on a cold damp night." (ETO)

488. Sights. "Black paint on the outside of the aperture of the direct fire sight on the M10 will greatly reduce the glare." (ETO)

489. Speed. "The increased speed of the M18 TD has proved to be a definite advantage in combat. Enemy gunners, apparently unable to estimate proper leads, constantly drop their shells to its rear." (ETO)

490. Tank Threats. "Investigate all reported tank threats prior to moving the TD battalion." (ETO)

491. Traction. "The welding of stainless steel knobs, nine knobs per chevron, gives additional traction on ice. Weld two bars of armor plate in a V-shape on every other steel block of the track. The V points to the front of the vehicle when viewed from the top of the track. This device provides traction and prevents side-slipping on icy or frozen ground." (ETO)

492. Tracks. "Improvised track extensions give greater flotation to medium and light tanks. The extensions require the welding of metal plates and bars to grousers which are then fastened to smooth rubber track in the normal manner, increasing the width of track by about three-fourths." (ETO)

493. Tracks. "Tanks should carry two one-eighth track lengths, providing a spare track and giving extra protection to tank and crew." (MTO)

494. Turret for TD. "To protect them from artillery fire and tree bursts, crews placed logs and sandbags on top of the TD turrets. Such an arrangement turned a direct mortar hit." (ETO)

495. "White-Phosphorus Shells are more effective than HE for burning enemy tanks." (ETO)

496. Wire. "Destroyers should be equipped with two hooked poles to facilitate lifting field wire lines and running under them." (ETO)

497. Woods. "When entering woods with TD's, go in backwards so that you can come out in high." (ETO)

Chapter 9

MEDICAL SERVICE

498. Aid Stations. "In selecting site for an aid station, the fact that wounded may have to be treated at night as the result of enemy artillery action should not be forgotten. If a tent is used, it should be prepared so that it can be blacked out in a few minutes. Where buildings are available they are superior to tents. They offer more protection, not only to the medical personnel who can more efficiently render treatment if they are not anticipating shell fragments interfering with their work, but the wounded being treated feel safer and their apprehension is considerably allayed for the time they remain in the aid station. Dressings cannot be properly applied nor plasma be adequately given if the patient has to be restrained when he hears shells coming and attempts to seek shelter." (ETO)

499. Airborne Operations. "The clearing element of the airborne division medical company should plan to be self-sustained for lifesaving surgery, holding patients, and preparing casualties for transportation when evacuation becomes possible. Increased medical support for the parachute elements of an airborne division can be obtained by means of a glider lift of second echelon medical personnel and equipment to accompany the parachute lift." (ETO)

500. "Athletes Foot can be cured by having men exercise or march barefooted in sand, preferably on salt water beaches." (SWPA)

501. Battle Fatigue of Tankers. "Tank fatigue exists but generally a good night's sleep away from the action fixes it up. It occurs after the pressure ceases; then the men simply let down completely and are listless and lifeless." (ETO)

502. Battle Fatigue of Tankers. "Remedy: units are rotated on the more difficult missions. The worst cases are relieved and sent back to the dispensary or the battalion rear echelon, depending upon their condition, where they are given medical treatment and rest. It normally requires about one week for the men to recover from this condition and

they always rejoin their crews voluntarily. In addition we rotate the diet of the tank crews as much as available rations will permit. During rest periods, they get every consideration commensurate with discipline. The men are relieved from routine duties and allowed to come and go at will. We have had little trouble with excessive drinking as the men found out that too much alcohol lowers resistance to tank fatigue." (ETO)

503. Burns. "The Jap air force has used WP bombs. Personnel should have thorough instructions in first aid for burns." (SWPA)

504. Evacuation. "One of the reasons a soldier dislikes making a night attack is that he fears being wounded and overlooked in the darkness. Attaching luminous tape or markers to the men would help overcome this feeling." (ETO)

505. Evacuation. "Successful and rapid evacuation of wounded depends upon the following: (1) aggressiveness of unit surgeons in keeping personnel and unit installations forward, (2) close coordination and contact between the division surgeon and surgeons of subordinate units, (3) the establishment of ambulance loading points along the axis of advance." (ETO)

506. Evacuation. "I believe that an advanced loading point with two or three ambulances is better than the shuttle system for evacuation from the battalion aid station to the collecting station. It is extremely difficult to operate a shuttle system in a blackout. In a fast moving situation, we have found that assigning an ambulance to each battalion aid station is the best solution." (ETO)

507. Evacuation of Wounded. A wounded man lying in an area still under fire can be evacuated by straddling him with a full-track vehicle, then pulling him through the hatch.

508. Evacuation, River Crossing. "The evacuation problem in a river crossing is always great where initial losses are heavy and where the crossing of medical transportation is unduly delayed. Plans should be made for the emergency treatment of wounded on the far shore in the event that it becomes necessary to establish priorities for crossing them to the near bank for further treatment. Surgeons, surgical dressings, and medical supplies must be available for this purpose. Delay in evacuating casualties across the river can be alleviated somewhat by encouraging the walking wounded to use footbridges." (ETO)

509. First Aid. "It has been observed that few wounded men apply their own aid dressings but wait until the aid men arrive. The individual line soldier's responsibility for first aid must be indoctrinated continually." (ETO)

510. Jeep Ambulances. "The importance of jeep ambulances cannot be overestimated. In one of my regiments, the jeeps have evacuated casualties each day since D-day." (ETO)

511. Plasma Bottle. "A hook or clamp to hold plasma bottles in the rear of the ambulances is needed. With four litter cases, there is not enough room for a man to hold the bottle." (ETO)

512. Surgeons. "Battalion and regimental surgeons will manage evacuation problems more intelligently and alertly if they are kept acquainted with the situation. The indulgent doling out of necessary information upon requests from the surgeon discourages him and causes him to lose incentive and initiative." (ETO)

513. Tank Ambulance. "In combat it is often impossible for the medics to evacuate wounded in the normal way. In such cases we put a stretcher on the back of a light tank and evacuate the wounded by that means." (ETO)

514. Training. "Medical personnel should have more basic infantry training. Subjects such as cover and concealment, map and compass work, and all others that would enable such personnel to protect themselves from enemy fire should be included in their training." (ETO)

515. Treatment Stations. "It was found necessary, in order to insure close and continuous medical support, to move the treatment stations frequently, often twice a day. One section of the treatment platoon remained mobile and could be quickly moved forward. The remaining section remained open to receive casualties until the other opened in the new area." (ETO)

Chapter 10

COMMUNICATION

516. Administrative Channel. "The channel normally taught as 'administrative' is used by the executive (tank battalion) who controls the fires of mortars, assault guns, artillery, and one of the companies when it forms part of the base of fire. He is also charged with effecting the forward displacements of these elements as necessary. This channel greatly facilitates control." (ETO)

517. Air-Ground Communication. "Divisions were directed to mark on the ground a prescribed letter, this letter to be about 50 yards across. At night the letter was to be outlined with fire, using C ration cans, partly filled with dirt and gasoline, to be lighted at a prescribed time." (NATO)

518. Air-Ground Communication. "The solution has been to mount the very high frequency radio (SCR-522) furnished by the air force, in tanks. These vehicles moved near the head of each column and maintained contact with the column commander through the organic tank radio. The special radio sets were operated by the air support party personnel who were familiar with their characteristics and capabilities. All communication was by voice in the clear since the action was moving too fast to allow the enemy to take advantage of intercepted information. To insure recognition, all friendly vehicles carried red (cerise) panels. In addition, the vehicle in which the air support party officer was located carried a yellow panel at the rear. Since this vehicle was always near the head of the column, its location fixed the limit of advance of friendly armor. In addition, planes would always check with the air support party officer by radio before attacking doubtful targets." (ETO)

519. Alternatives. "Have as many alternative means of communication as possible. If the mechanical means fail, never delay a message until they are repaired. A runner, sent off immediately, will usually get there first." (MTO)

520. "Amphibious Operations require extensive use of radio communication. It is virtually impossible to maintain wire communication for the first several days; bulldozers and vehicles continually tear out all wire." (SWPA)

521. Antenna. "When in heavy brush or woods we avoid breaking the SCR–300 antenna by substituting a 3- or 4-foot length of wire from the antenna socket to the strap on the operator's steel helmet. This gives excellent reception." (ETO)

522. Antenna. "When setting up in a building we get better reception by putting the aerial of the SCR–300 out of a second story window and running W–130 wire from the base of the aerial socket in the radio. The radio can then be placed anywhere in the building." (*Note:* Other similar reports have been received on improvised antenna for the SCR–300 radios. The signal section points out that the SCR–300 has a tuned antenna and any variation in length will not affect reception but may reduce the transmission range of the set.) (ETO)

523. Antenna. "The only type of antennae which functioned satisfactorily in mountainous terrain were flat top antennae on SCR–399 and SCR–299, and inverted L antennae on SCR–193." (ETO)

524. Batteries. "New but defective BA–70 and BA–80 radio batteries sometimes can be made to work by a simple expedient. Remove the battery from the radio, cut around the terminal base with a knife, lift up the base and reconnect any of the wires found broken." (ETO)

525. Batteries. "Substitutes for BA–40 batteries, for the 600–series radios, can be made by taping together four BA–2's stacked two high, with two BA–23's placed alongside of them, and a plate plug from an old BA–40 added to the top of the stack. The BA–2's are connected in series and the BA–23's in parallel." (ETO)

526. Batteries. "Daily issue of radio batteries with rations was found to be a means to insure keeping radios in action." (ETO)

527. Combating Location Finding. "A station and the command post it serves can be located accurately by bearings taken over a period of time. Deny the enemy these bearings by first insisting on proper procedure; second, by reducing radio traffic to an absolute minimum; and third, by periodic movement of stations about the command post." (ETO)

528. Discipline. "Prisoners state that our tank crews do not have enough radio discipline. The Germans have similar sets in their armored vehicles and can easily monitor our conversations. Very often our intentions were given away by crews talking before the attack started." (ETO)

529. "Distance in Radio Transmission can be improved by observing the following factors:

Location
Loading of set
Grounding of set
Proper use of counterpoise
Proper transmitting antenna (whip, doublet, wire)
Proper receiving antenna
Resourcefulness and perseverance of operators in working through interference." (ETO)

530. Enemy Equipment. "Much valuable captured signal equipment has been damaged, pilfered, or destroyed after our own troops have occupied the premises. Special provisions should be made for trained signal personnel to enter such premises immediately upon occupation by our own troops. Such personnel must be able to evaluate and direct the protection of all remaining equipment." (NATO)

531. Flares. "The increased use of flares in place of smoke for visual signaling is suggested. The equipment necessary is not so bulky and flares do not have the tendency to reveal position and thus draw fire as smoke does. Their increased use in tank-infantry operation as a supplementary means of communication is highly recommended." (NATO)

532. "Flares launched from the rifle grenade launcher have proved more satisfactory than mortar flares or ground projector flares." (MTO)

533. Forward Observers. "It has been found that a two-channel radio system for all observers will relieve the field artillery battalion fire direction channel of considerable traffic not pertinent to fire missions. The alternate channel is used to carry such transmissions as position reports, reports of forward elements, information for S–2 and other transmissions not essential to the conduct of fire." (NATO)

534. High Ground. "We have found it necessary to establish firmly in company and battalion SOP the practice of selecting high ground for net control stations, so far as the tactical situation permits. This habit obviates the necessity for establishing relay stations." (MTO)

535. "Homelight Charging Sets are one of the biggest fuel savers the Army has; we must run our engines about 35 percent of the time just to keep the batteries charged so that the radios can be operated. In a static defensive position, the waste of fuel is practically 100 percent for the sole purpose of keeping the batteries charged." (ETO)

536. "Infantry Companies and TD Platoons must be tied in with wire, and by radio if possible, to insure mutual support and coordination." (ETO)

537. Interception. "When using the SCR–536 on patrols, the antenna is kept nearly all the way down, except when transmitting. This reduces receiver noises which might be overheard by the enemy." (ETO)

538. Jungle. "Expect radios to fail to function in the jungle. Halts will often have to be made to permit radio contact under favorable conditions. In North Burma, reception and transmission are best during the middle of the day." (CBI)

539. Liaison. "Experience indicates that provisions must be made for rapid communication between tanks and the supporting infantry units. The radio set SCR–300 has proved very valuable for this purpose." (ETO)

540. Message Writing. "It is essential that officers learn how to write messages. The majority of the messages received were entirely lacking in one or more important items." (MTO)

541. Messenger. "Constant changing of relief drivers on motor messenger runs resulted in all drivers knowing unit locations for next scheduled or special runs. Our messengers have always watched closely for any troop movements and are instructed to stop and make inquiries of headquarters along their routes. This information is reported to the message center chief upon return." (MTO)

542. Oral Messages. "The importance of training in oral messages cannot be overstressed. They are used time and again in the front lines and they must be passed on accurately." (ETO)

543. "Monitoring of circuits revealed a tremendous level of unnecessary calls and idle chatter. It is recommended that an officer monitor periodically and control conversations of this type." (MTO)

544. Pigeons. "In amphibious operations, pigeons proved valuable in obtaining information from distant patrols. Pigeon detachments should be included with each task force and maximum use made of them by patrols." (SWPA)

545. Pigeon Training. "Four days, as the minimum period within which birds can be properly settled, has not been found to be reliable. For practical purposes, it was found necessary to revise this figure upwards to a minimum period of six, and preferably seven, days." (NATO)

546. Radio Communication between Tanks, Infantry, Tank Destroyers, and Artillery. "Every company commander's tank has a 300-series radio set. Each company has an artillery observer from supporting artillery units. He usually rides in the assistant driver's seat with an SCR-609 series radio set. The battalion executive officer has an artillery observer in his tank with a radio. All companies are now in direct radio contact with the supporting tank destroyer company." (MTO)

547. Radio Use. "There should be less use of radio and operators should turn off transmitters after sending messages. Too many transmitters are going out from overheating." (NATO)

548. Radio Silence. "An order from higher headquarters to observe radio silence has often been interpreted to cover only long-range or high-power sets. Movements are continually given away by low-power sets, particularly radios in armored vehicles which have been used for column control, despite the fact that the enemy lines were thought to be out of range. The skip phenomena in radio interception is well known to signal communication officers. There is only one brand of radio silence that is effective and that is 100 percent silence. Throughout the campaign in Europe, radio has been the enemy's primary source of information about our order of battle—and hence our intentions." (ETO)

549. "Rain Cover for the Antenna Base of a radio can be made by punching a hole in the bottom of an empty fiber shell case, then shoving the antenna through the hole and sliding the case down to cover the base." (ETO-SWPA)

550. Remote Control. "To operate the SCR-608 by remote control, use a four-wire cable between the radio and the RM-29. This extends the RM-29 transmitting and receiving cables a sufficient distance to be fitted with the microphone and receiver jacks and placed in their

respective places in the radios. This permits the sender himself to start the radio dynamotor from any distance by depressing the handset transmitter button. This still permits the use of the control unit as a telephone by throwing the switch to 'telephone' instead of 'radio'." (ETO)

551. Signals. "Luminous watches or compasses may be used for sending prearranged signals at night. The watch or compass is strapped to the inside of the hand and signals given by opening and closing the hand." (MTO)

552. SOI. "No other communication agency makes as much use of SOI as message center. The division message center keeps current SOI's of all units with which concerned. The message center officer checks constantly to see that the current and only the current items are in use. All superseded items and expired codes and other cryptographic equipment are promptly destroyed and reports rendered." (MTO)

553. Spare Handset. "Carrying an extra SCR–300 handset permits keeping the radio in operation when the handset fails because of mud, rain, or moisture from the operator's breath. The operator should carry the handsets inside his shirt to prevent freezing in cold weather." (ETO)

554. Switchboards. "To reduce holding time and avoid disconnections, the TC–4 cords and supervisory circuit drops should be coded red, green, and white. The Germans use this system on their field switchboards, as do our own commercial firms." (ETO)

555. Tank Destroyers. "In a joint operation, it is necessary for TD's to have communications with the infantry and tankers. A simple method is to have both TD and tank platoon leaders equipped with SCR–300 sets on the infantry frequency." (ETO)

556. Throat Mike. "A throat mike and a headset that covers one ear are better than the regular handset for the SCR–300 operator. With them he can hear his radio and other instructions close by and still act for his personal safety without being hindered by a handset." (ETO)

557. Training. "Officers continue to be quite unaware of the capabilities and limitations of radio communication and equally ignorant regarding security. Virtually all security breaches are made by officers and in many cases, over the advice of radio operators. Two procedures would correct the above failing. First, all officers should receive more training on the subject before coming into action; this should be live and prac-

tical training not theory and lecture. Secondly, they should be made to use the radio during training periods and at regular intervals so that when an emergency arose they would be prepared. This should be followed up closely by disciplinary action for security breaches." (MTO)

558. Training. "All new replacements were trained first as foot messengers and motor messengers even though they were later to become code clerks. This has resulted in the technicians and noncoms knowing more of the basic messenger routine." (ETO)

559. Verification. "Any messages coming from an unknown source must be authenticated. Radios should be used as little as possible when tanks are not actually in combat." (NATO)

560. White Star. "We like the white star parachute signals fired as rifle grenades for illumination in repelling night tank attacks." (ETO)

561. Wire Identification. "The now universal practice of notching and shaping wire tags for identification by touch has resulted in much duplication. The SOI should establish a controlled identification of tags through allocation of particular shapes." (ETO)

562. Wire Laying. "Line construction must be especially good when operating with tanks. Every conceivable crossing must be well overheaded or buried. Burial at crossings should exceed eight inches to protect that wire from tanks. All wire must be dressed well off the shoulders and preferably up on ledges and banks." (MTO)

563. Wire Laying. "Wire can be laid over difficult terrain by attaching a reel to an observation plane." (MTO)

564. Wire Laying. "The rifle grenade will carry W–110 wire from 100 to 125 yards. If the safety pin is pulled, the explosion will destroy about 10 feet of the wire; if the pin is not pulled, disposal of the dud is necessary. With the bazooka, the round is not removed from the cardboard case. The nose cap of the case is removed and a slot cut in the side of the case back to the fins of the round. The bottom end of the case is left in to prevent the round from sliding through. The case is taped to a tree or post at the desired angle. A stick long enough to reach the ground is taped to the lower end of the case to serve as a brace. The wire to be projected is tied to the pipe of the rocket through the slot in the case and is coiled on the ground nearby in figure eights. The rocket is fired by a battery which, for safety, should be about

10 yards away. With a 30° to 35° elevation, the rocket will carry W–110 wire about 180 yards and W–130 wire about 225 yards." (ETO)

565. Wire Laying. "A packboard wire carrier on which wire unreels from a man's back was made from an RL–27–B axle, a DR–4 reel (made 8 pounds lighter by cutting the metal from between the spokes) and a pike pole. The axle was cut and fitted into a bearing housing, which was welded to strap iron braces bolted to a plywood packboard. A pike roller mounted on a pivot that swings through a 90° arc at the bottom of the packboard prevents the wire from kinking. The first man of the regular two-man team carries this special reel. The second man uses a packboard to carry wire that has been removed from its reel and wound for the packboard reel. When the first pays out, this second load is merely slipped on to the wire carrier on the first packboard. Elimination of the second reel lightens the load 22 pounds. An additional half mile of W–110 wire can be carried by the two-man team. The two men also have their hands free for wire tying, climbing, and using their weapons." (POA)

566. Wire Laying. "One fast method of elevating W–130 wire is to slash trees at about shoulder height and lay the wire in the gash between the trunk and the peeled back bark. This obviates making a tie, which was the most frequent cause of wire shorts." (ETO)

567. Wire Laying. "Our wire teams use a diamond formation for protection. The corporal stays out in front, reconnoitering and making frequent halts to observe for signs of the enemy. The wire-laying group consists of a jeep with a driver and one man to lay the wire or two men with an RL 27; it follows the corporal. The fourth man, following at about 100 yards, polices ties, tags, and tests the wire and acts as get-away man. If available, two additional men are used for flank protection." (ETO)

568. Wire Laying. "Wire lines will stay in longer and lives of linemen servicing them will often be saved if wire-laying teams will pay more attention to using cover and protected wire routes. These routes may be a little longer but wire knocked out because it was improperly laid on exposed routes often costs the lives of linemen who, working in small groups, are good targets for enemy snipers." (ETO)

569. Wire Laying Teams Used for Maintenance. "By using the same personnel who installed a wire line to maintain it, the initial work was better, since the men knew it would directly affect the amount of work that would follow. Using the same men for a considerable length of

Figure 21. Wire-laying parties need protection.

time to maintain a group of circuits resulted in their becoming very familiar with every weakness and likely trouble point. Thus they could easily locate trouble that did develop and they made improvements each time a case of trouble appeared. After a few days the circuit would become trouble free." (MTO)

570. "Wire Line Tags should be punched, painted, or cut in distinctive shapes. Written identification on the tags becomes unreadable in wet weather." (ETO)

571. Wire Police. "Lines are not properly policed. Too many circuits are lying along the edge of the road where they are being covered with mud and overrun by vehicles. These lines must be raised off the ground. It is not necessary that they be raised to a maximum height along the roads where traffic will not turn off to the side, but they must be raised out of the mud and water if satisfactory telephone communication is to be maintained. Policing is a continuous job. Lines should be patrolled and weak points corrected by wire patrols at least twice each day. Proper policing will prevent many hours of trouble shooting." (ETO)

572. Wire Retrieving. "We have welded a metal ring, resembling the eye of a needle, in the angle-iron wire cutting device on the front of our jeeps. By threading wire to be retrieved through the ring and back over the jeep to the wire reel, one man and a driver can easily pick up the wire. The RL–31 is centered in back of the front seats and held in place by sandbags." (ETO)

573. Wire Routes. "If covered routes are used for laying wire, linemen will be protected making future repairs." (ETO)

574. Wire Splicing. "Splice wire between reels in a defiladed area in order to avoid having to do so while exposed." (ETO)

Chapter 11

SUPPLY

575. Airborne Forces. "Airborne forces can exist for several days on the supplies they bring in with them, provided enemy resistance is not too intense. It is believed that resupply by glider would be a far more efficient method than by parachute." (ETO)

576. Airborne Operations. "Air resupply and evacuation should be considered at the outset of planning of airborne operations. Depending on the estimated period during which the airborne forces must sustain themselves without support by friendly ground forces, the importance of air resupply may vary from a very secondary element to an important part of the operation's planning, *fully equal to that of the troop delivery.* In the latter case, its importance must be accorded full consideration in all phases of planning. It is entirely conceivable that an estimate duly arrived at, of the impracticability of air resupply might alone dictate the abandonment of an otherwise feasible airborne operation." (ETO)

577. Ammunition. "The regimental munitions officer must constantly salvage unexpended ammunition. Any known battalion or gun position dumps should be reported to him, and he must also scour the woods." (ETO)

578. Ammunition. "Battalion supply officers equipped each replacement with two extra bandoleers of .30 caliber ammunition, two fragmentation grenades, and a WP grenade at the service company bivouac before taking him forward to the battalion. This was a considerable aid in keeping the companies supplied with ammunition." (ETO)

579. Ammunition. "Commanders have difficulty getting new men to understand that they must take all the ammunition they need from the bodies of the dead, and from casualties that are to be evacuated. This is important enough to merit its being taught in basic and unit training. Supplies must not be allowed to go to the rear, even as far as the battalion aid station." (ETO)

Figure 32. Carry extra ammunition.

580. Ammunition. "Two bandoleers should be issued to every rifleman before an attack to cover his needs during reorganization, without an additional supply. Every effort must be made, however, to get ammunition forward as soon as the objective is taken. Riflemen often use larger amounts of ammunition than usual when they employ marching fire; they feel insecure if they have only a clip or two left." (ETO)

581. Amphibious Operations Identification. "All equipment should have distinguishing marks that are visible at a distance and at night." (POA)

582. Amphibious Operations. "Officers who supervise the loading should also supervise the unloading at destinations. The loading plan must be followed rigidly in order that unloading under fire may be expedited. Every piece of armanent, vehicle, fire-control equipment, etc., should be accompanied by the technician or NCO in charge of it, throughout the processing, loading, shipping enroute, unloading, and reinstallation phases." (POA)

583. Battlefield Salvage. "We organized a division salvage detail of one noncommissioned officer with a 2½-ton truck to work directly under

G–4. The detail searches areas that have been cleared or are being cleared by units of the division and turns in all salvage to the division quartermaster." (ETO)

584. Care of Equipment. "One of the soldier's biggest weaknesses is his waste of equipment and matériel. He does this because of his American tendency to think that 'there is plenty where this came from.' Subconsciously he knows that America is a land of plenty and shortages or costs do not enter his head." (ETO–SWPA)

585. Care of Equipment Is Neglected. "Critical and delicate items, such as radios and telephones, are banged around and thrown in the mud. Drivers run over gas cans lying in the road rather than make the effort to avoid them. Important items of equipment are left lying in the road and men pass them by without making the slightest effort to move the articles to a safe place." (MTO–ETO)

586. Clothing. "Front line soldiers should not have to carry extra clothing. The service companies can carry one shirt, one pair of trousers, one set of underwear, two pair of socks, and one quarter pair of shoes per man. A set of clothing for each man can be sent to battalions about one each week; the soiled clothing is then collected, laundered, sized, and returned to the service company. Under this system, the bulk is less than a barracks bag for each man, and clothing can be exchanged when it would be impracticable to get the barracks bags forward. This also reduces losses caused by the throwing away of soiled clothing." (ETO)

587. Daylight Supply. "Resupply of front line units is done in daylight. It is impossible to find the way around at night, and ambushes are too easy. The platoon sends a 1½-ton truck to company with empty water cans; battalion sends ammunition, water, fuel, and rations to company. A transfer is necessary since the 2½-ton truck cannot operate on the battlefield while the 1½-ton truck with a lower silhouette can. Platoon radios ammunition expenditures to company on a prescribed schedule. A serious annoyance has been the delivery of fuel in 55-gallon drums instead of 5-gallon cans; it must be transferred to cans, since the drums cannot be handled up front." (ETO)

588. Fuel and Ammunition. "Temporary withdrawal of tanks from action is more often due to the failure of fuel and ammunition supply than any other cause." (NATO)

589. Grenade Launchers and Bayonets. "Reinforcements armed with rifle should have grenade launchers and bayonets and men armed with a carbine, grenade launchers; these items are always short and cannot be issued by the unit." (ETO)

590. Kitchens. "By keeping our kitchens under battalion control we are able to keep them close behind the troops and serve more hot meals. No time is lost moving meals or kitchens, the use of the vehicles is reduced, and the road traffic is accordingly lessened." (ETO)

591. Messing. "Meal hours should be varied. In a defensive position in France we had our kitchen situated about 600 yards from the front lines. Hot meals were served at 0600, 1200, and 1700. As a result, we were shelled daily." (ETO)

592. Night Supply. "Time of resupply at night should be changed from time to time to prevent losses from enemy artillery fire." (MTO)

593. Oil. "Send oil for weapons in pint or quart cans with ration and ammunition to assaulting units. Oil is necessary to keep weapons functioning in combat." (ALASKA)

594. Rations. "Each weapon carrier of the battalion carried one case of K-rations at all times, for emergencies. These proved quite convenient for feeding independent groups that had to be sent out in a hurry." (ETO)

595. "Ration Packboards fitted with 60-mm mortar ammunition cartons filled with preheated C-ration cans have been found satisfactory for transporting rations forward. Hot liquid may be dispensed to each soldier from a 5-gallon water container fitted with a spout and also carried on a packboard." (MTO)

596. Ration Wastage. "One captain required his men to put uneaten components of the C-ration, such as biscuits and cans of meat, in a box. In a few days enough food was saved for the company to enjoy meat loaf upon the arrival of kitchen facilities." (ALASKA)

597. Salvage. "Our battalion A & P platoon follows the companies and places all the recovered material in squad piles. Each company supply sergeant takes from these piles such items as his company can use. The remainder is placed in a battalion pile and turned over to

the regimental S–4, who cleans, sorts, and reissues it, finally turning in what is not required to the division QM." (ETO)

598. Salvage. "We keep an NCO at each aid station to collect all organizational equipment, particularly watches and compasses, from the wounded. The battalion supply officers pick up this equipment daily. We have also organized a regimental graves section consisting of one officer and thirty men. Seven men are attached to each battalion during attacks, for the removal of battlefield dead. When we are in a defensive position, these sections police the area for abandoned equipment. Company supply sergeants are good men to direct this search, since they know the former locations of their companies." (ETO)

599. Salvage Gathered during Exercise Periods. "Exercise for men normally confined by headquarters work was turned into a useful activity by one battalion. Each officer and enlisted man of the headquarters was required to take a daily hike of an hour and 15 minutes, carrying back as much salvageable property as he could find. In six days, this system netted 800 gasoline cans, 120 water cans, 16 M1 rifles, 60 miles of field wire, 35 wire reels, 1 truck tire, 14 blankets, 11 raincoats, 26 pairs of woolen trousers, and much other material." (ETO)

600. "Salvage is a very necessary job and is best accomplished by troops occupying forward areas. Civilians quickly pick up quartermaster items if salvage is not rapidly accomplished." (ETO)

601. Shoes. "We found that composition soled shoes outlast leather." (ETO)

602. Shooting Supplies. "The division ordnance emptied the chemical from smoke shells and filled these shells with medical supplies or with D-rations. These shells were fired successfully into the infantry location by the division artillery." (ETO)

603. Snow Suits. "With holes cut for head and arms, mattress covers make excellent camouflage suits for operations in snow." (MTO)

604. Spare Parts. "Since many spare parts are critical, stripping of vehicles is habitual. Leave security personnel on disabled vehicles. Keep available spare parts in forward depots to cut down on delays for combat vehicles. A unit tire pool will facilitate emergency supply." (ETO)

Figure 23. Improvised snow suits.

605. Spare Supplies. "Fast-moving situations demand huge amounts of gasoline. Weld extra gasoline racks on combat vehicles; tires may be mounted in new locations; utilize captured enemy trailers." (ETO)

606. Vehicles. "Replacement vehicles in the field must arrive with complete equipment and pertinent manuals." (ETO)

607. Wire Supply Is Critical. "As command posts advance, all abandoned field wire and cable must be recovered and serviced for re-use by the units concerned." (ETO)

Chapter 12

MAINTENANCE

608. Amphibious Operations. "The shortage of transportation, particularly on amphibious operations, makes motor vehicles maintenance of the utmost importance. The following steps have been found particularly helpful: change grease in wheels as soon as possible after being submerged in water; check nuts and bolts frequently; clean top of battery after every landing; change crank case oil frequently." (POA)

609. Cold Weather Starting. "Chip ice from moving parts and around wheels. Do not move the vehicle if the clutch slips when the engine is raced, or the power train may break. Look for hard stands for vehicles." (ETO and MTO)

610. Driver Maintenance. "Service units report that, almost without exception, vehicles presented for repair (excluding those in accidents) were the result of driver neglect. Little attention was paid to the proper inflation of tires." (ETO)

611. Field Range Generators. "We find that we can renovate generators for the field range M–1937 conversion set No. 2 (simplified), by cutting them open, replacing the steel wool, and welding them together again." (ETO)

612. Field Shops. "Maintenance output increases as working conditions for mechanics improve. Provide shelter and hard standing whenever possible. Install lighting for night work in maintenance trucks; a seal beam unit will suffice." (ETO)

613. Gas Cans. "I have seen full gas cans thrown off trucks onto the ground. This practice fractures the seams on the gas cans. The next time these cans are filled and loaded on a truck a stream of gasoline runs out. We were having carburetor and fuel filter trouble in our vehicles. It was traced to the practice of using camouflage nets to cover gas cans whose lids were off. The strands of garnish material and dried mud on the nets fell into the cans." (ETO)

614. "Gun Tubes can be preserved and maintained very satisfactorily by using Diesel fuel as a solvent and cleaning agent." (MTO)

615. Leaks. Leaking fuel tanks can sometimes be stopped temporarily with soap plug or self-tapping screws; leaking fuel lines with windshield wiper hose; and brass fuel fittings by winding string, thread, or cloth around the tubing against the flare. (ALL THEATERS)

616. Light Tanks for Recovery. "A light tank should not be used to retrieve another light tank. Excessive strain placed on the transfer unit causes the low gear and the reverse bands to slip." (ETO)

617. Location of Maintenance. "Moving vehicles back to maintenance shops is very difficult. Maintenance support is most effective when well forward." (NATO)

618. Maintenance Trucks. "A removable A-frame to fit on the front bumper of the maintenance truck will aid in many maintenance and recovery operations." (MTO)

619. Quadrant, Range. "When the brass lug on the range quadrant M8 for the 105-mm howitzer M3 shears off, a successful replacement can be made by cutting a channel at the former location of the brass lug and inserting a brazed and smoothed steel lug." (ETO)

620. Sandbagging Vehicle Floors. "Before placing sandbags on the floors of vehicles, swab the floor with heavy oil. If this is not done, the metal floor will rust badly when the sandbags become watersoaked. It is necessary to oil the floors about once a month." (ETO)

621. Signal Equipment. "The maintenance of signal equipment can be expedited by a signal supply and maintenance truck kept at the forward echelon of division headquarters." (ETO)

622. Spot Check. "When officers checked at least one item on each vehicle before using, drivers used more care in first echelon maintenance." (MTO)

623. Steering Band. "When tanks are employed as artillery with their front end up in the air, they should be pulled out at least once every four days so that the bands in the controlled differential will not get too dry." (ETO)

624. Tail Lights. "Tape tail light connections to prevent the weight of accumulated mud from pulling them out." (ETO)

625. Tire Protection. "When vehicles are parked, sand filled ammunition boxes placed against the tires will prevent blowouts from shell fragments." (ETO)

626. Tire Repair. "An emergency hot patch can be made with rubber tape, an old hot patch tin, and gunpowder." (ETO)

627. Tires. "One company reduced the daily average of flat tires from seventeen to two by having all drivers probe their tires daily to locate and remove embedded foreign objects which had not worked far enough into the tires to cause a puncture." (ETO)

628. Tires. "Low tire pressures are recommended for use in crossing soft sand. Dual tires should not be deflated to a point where less than a half-inch remains between tires." (SWPA)

629. Trailer. "A high mortality exists in the springs of the ¼-ton trailer; a two-inch rubber block between the axle and the frame will reduce breakage." (ETO)

630. Training. "Maintenance personnel should have familiarization firing with all weapons used on combat vehicles. Enemy units frequently penetrate as far as maintenance installations, and such areas must be defended with every available weapon." (ETO)

631. "Tropical Climates have decided corrosive effect on vehicles. Electrical systems, brakes and wheels, fuel and exhaust systems, bodies, tracks, and suspensions seem to be affected most. Rubber rots; metal rusts; oil emulsifies; canvas mildews. Run engines daily to prevent internal condensation; change hydraulic fluid in brake systems monthly; keep exposed metal surfaces painted; check all parts of vehicles thoroughly and continually for signs of corrosion and deterioration." (POA and CBI)

632. Watches. "Have the personnel officer see if you have an ex-watchmaker in the regiment. A good cleaning makes many watches as good as new. Tools are easily improvised, or may be purchased from any village jeweler." (ETO)

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